

FIFTH BIENNIAL REPORT
OF
The Department of Conservation
and Development
OF THE
STATE OF NORTH CAROLINA



BIENNIUM ENDING JUNE 30, 1934

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~~MAY 11 1933~~

FIFTH BIENNIAL REPORT
OF
THE DEPARTMENT OF CONSERVATION
AND DEVELOPMENT
OF THE
STATE OF NORTH CAROLINA
FOR THE BIENNIUM ENDING JUNE 30, 1934

BOARD OF CONSERVATION AND DEVELOPMENT *

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R. BRUCE ETHERIDGE, Director..... Raleigh

* There is one vacancy on the board.

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STATE PRINTERS
Raleigh, N. C.

LETTER OF TRANSMITTAL

Raleigh, N. C.
October 15, 1934.

To His Excellency, HON. J. C. B. EHRLINGHAUS,
Governor of North Carolina.

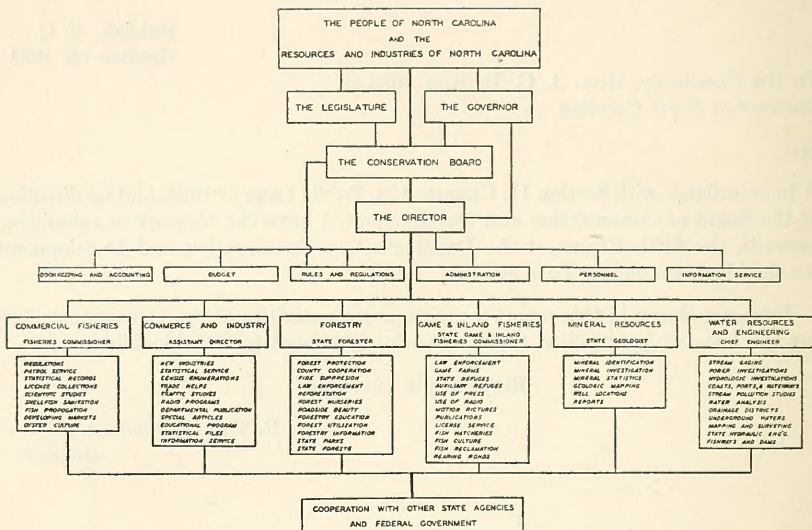
Sir:

☞ In accordance with Section 11, Chapter 122, Public Laws of 1925, and by direction of the Board of Conservation and Development, I have the pleasure of submitting herewith the Fifth Report of the Department of Conservation and Development for the biennium ending June 30, 1934.

There are shown in this report a review of the activities of the Department during the last two-year period and a financial statement for the biennium.

Respectfully submitted,

R. BRUCE ETHERIDGE,
Director.



DEPARTMENT PERSONNEL AND PRINCIPAL OFFICERS

ADMINISTRATIVE

R. BRUCE ETHERIDGE, *Director*, beginning September 1, 1933

J. W. HARRELSON, *Director*, until September 1, 1933

PAUL KELLY, *Assistant Director*

R. N. SANFORD, *Auditor*

MRS. ETOYAL P. HOBBIE, *Fiscal Clerk*

GLADYS PRITCHETT, *Purchasing Agent*

FRANCES POPE, *Stenographer*

DIVISION OF COMMERCIAL FISHERIES

CAPT. JOHN A. NELSON, *Commissioner*

N. R. WEBB, *Fiscal Clerk*

MARY E. WILLIS, *Stenographer*

A. B. FREEMAN, *Assistant Sanitary Engineer*

Assistant Commissioners:

J. H. STONE, Wilmington

E. O. SPENCER, Swan Quarter

L. A. QUIDLEY, Manteo

DIVISION OF COMMERCE AND INDUSTRY

PAUL KELLY, *Chief*

DIVISION OF FORESTRY

J. S. HOLMES, *State Forester*

W. C. McCORMICK, *Assistant State Forester*

GRACE WHITE, *Accounting Clerk-Stenographer*

MABEL DUKE, *Stenographer*

ANNIE RAMSEY, *Stenographer*

District Foresters

W. K. BEICHLER, Asheville

L. A. CARTER, Windsor

W. A. PETERSON, Fayetteville

DIVISION OF GAME AND INLAND FISHERIES

J. D. CHALK, *Commissioner*
C. L. BEDDINGFIELD, *Chief License Clerk*
MRS. ALICE W. AUSTELL, *Stenographer*

Assistant State Wardens:

J. A. BRADSHAW, Asheville	LARRY WARRINGTON, New Bern
FRED D. WILLIAMS, Fayetteville	W. C. LISK, Richfield

Fish Hatchery Superintendents:

Morrison Hatchery, FRANK J. REIGER, Balsam
Frank Stedman Hatchery, W. T. PARKER, Fayetteville
"Pete" Murphy Hatchery, FRANK S. DYSART, Marion
Boone Hatchery, C. E. SMATHERS, Boone
Roaring Gap Hatchery, WM. R. SKAGGS, Roaring Gap

DIVISION OF MINERAL RESOURCES

H. J. BRYSON, *State Geologist*

DIVISION OF WATER RESOURCES AND ENGINEERING

H. D. PANTON, *Chief Engineer*
W. H. RILEY, *Assistant Engineer*
ESTELLE FULLER DONNELLY, *Senior Stenographer*

REPORT OF DIRECTOR

This report presents only a brief summary of some of the more important activities and projects of the Department of Conservation and Development for the biennium of 1932-34. More detailed accounts appear in the reports of the various Divisions.

At the beginning of the biennium, the outlook for the State's conservation program was anything but promising. Appropriations were reduced more drastically than for any other agency. The legislative allowance amounted to only \$29,645 annually in comparison with \$80,800 for each of the preceding two years.

Department officials were faced with the unpleasant task of reducing personnel and operations to fit the pattern of available funds. Naturally, it was necessary to make sacrifices that impaired efficiency and limited our means of service and meeting public demands. In spite of this condition, no phase of the program previously undertaken was entirely dropped although some were suspended or only a bare form of previous operations was left.

However, at the time the picture appeared darkest, the conservation program was rescued from what appeared to be its least fruitful period and transformed into one of great productivity. We refer to the various emergency relief activities inaugurated by the Federal Government. Labor was provided for necessary improvements and for expansion of conservation activities and quantities of materials were furnished for these projects. The great cry was for useful work toward which to apply the energy of idle workers with funds for their remuneration made available by the Federal Government.

The temporary Civil Works Administration, the Federal Emergency Relief Administration, the Civilian Conservation Corps, and the Public Works Administration furnished facilities for carrying forward conservation activities that would otherwise have suffered materially through lack of adequate State provisions and for permanent improvements which would still be matters for consideration for years to come.

Launching of the various Federal relief agencies immediately threw a heavy burden on the Department's reduced personnel for suggesting, outlining, and preparing various work projects. Let it be said here to the credit of our organization, both administrative and field, that it worked untiringly and without complaining to take advantage of an opportunity of a lifetime to promote the State's conservation program. This necessitated continuously long hours and constant strain. Had the nucleus of a trained staff not been available, the State would have lost the benefit of much constructive work in behalf of her natural resources.

During the life of the Civil Works Administration, conservation projects which may be classed as permanent improvements proposed, outlined, and supervised by the Department of Conservation and Development costing more than \$250,000 were completed. This amount does not include most of the ECW work. Had more trained men been available to the Department it is entirely probable that more might have been accomplished under the CWA. However, the fact that a program of this size was carried through speaks well for the loyalty, energy, and interest of our force and the cooperation received from the officials heading the various Federal agencies.

The fact that so much of the relief labor was applied to the protection and development of natural resources may be attributed to President Roosevelt who has placed himself at the head of the leaders in conservation in thought and action. He has

shown an abiding belief in the necessity of preserving these gifts of nature for the future welfare and happiness of the people.

As a result of progress made possible by the various Federal agencies, the Department of Conservation and Development is in a better position to do a really effective work than ever before. Most of the permanent improvements were such as would have been necessary in the future and the use of Federal funds has brought about a large saving to the State. Another result of the expenditure of Federal funds has been to develop a public "conservation conscienciousness" to a degree that has never before been reached in our State.

Under the foregoing circumstances, it is necessary, if we would hold the ground already gained and carry out a program that even measurably meets the present day needs, for the General Assembly to provide more adequately for the Department of Conservation and Development in 1935. New responsibilities, including largely the maintenance of the improvements turned over to the State as gifts, face the Department.

COMMERCIAL FISHERIES

Considerable attention of the Board of Conservation and Development and the Director has been centered on this branch of industry because of its dire need of relief.

During the past several years the income of the commercial fishermen has been falling steadily. This fact, in the face of steadily mounting prices of other commodities, places the fisherman in a most precarious condition. Nature has also added to the hardships of the group in the form of devastating storms, which destroyed nets, boats and other equipment valued at around \$150,000 in 1933 and 1934.

Many fishermen would have been forced entirely out of operation following the storms had not the Federal government been liberal in the distribution of new nets, amounting to more than \$31,000 during the biennium. This project was sponsored and actively pushed by the Department of Conservation and Development.

The story of the fishermen's plight is told most effectively in the figures showing their income over the past several biennial periods. In the period 1928-1930, the value of all water products in North Carolina, according to the report of the Fisheries Commissioner, was \$9,240,469; during 1930-1932, this source of income brought the fishermen only \$4,293,396; and by 1932-1934, the value of water products taken in North Carolina was only \$2,480,386. This comparison shows that the fisherman, during the last biennium, received only slightly more than one-fourth of the returns of a similar period four years ago.

Effective measures have been put into force to bring up the income of the farmer, and something should be done for the fisherman. Unfortunately, there appears to be no machinery, such as the Agricultural Adjustment Act, that can be used in his behalf.

Legislation designed to give the fisheries the benefit of A. A. A. and other relief measures was introduced at the last session of Congress, and the Director of this Department appeared before a committee to urge its passage. For some reason, the bill was not enacted.

Among the first efforts of the Director after taking office was an attempt to establish a system of grading and standardization of seafoods in North Carolina. Conferences were held with U. S. Bureau of Fisheries officials and with a representative of the Virginia Department of Agriculture which had previously launched such a program. Efforts in this direction were suspended when it appeared possible that

such a provision would be incorporated in the National Fishery Code and because the funds and facilities for the work were not available. It is sincerely hoped that the General Assembly will make some provisions for promoting this important movement for assisting the fishermen. Officials of this Department believe that hundreds of thousands of dollars can be added annually to the income of North Carolina fishermen through the marketing of definite and standard grades of seafoods.

North Carolina has the distinction of being the first State in which the CWA undertook a program of oyster rehabilitation. The Department of Conservation and Development, with the assistance of Dr. H. F. Prytherch, director of the U. S. Bureau of Fisheries station at Beaufort, submitted a project for such a program to the CWA immediately after its operation was launched and it was quickly approved. A total of 774,038 bushels of oysters and shells were planted in North Carolina waters by the CWA under the supervision of the Fisheries Commissioner. Assurance has been given that the program would be continued by the FERA.

Another measure proposed by the Department for the benefit of the fishermen calls for the construction of quick freezing and storage plants by Federal relief agencies. Storing of surplus seafoods during periods of gluts and extremely low prices, it is believed, will bring about more orderly markets and a fairer return for the fishermen's products. Gov. J. C. B. Ehringhaus has assisted in the promotion of this and other measures for the relief of the fishermen.

In the meantime, the Department has continued to urge the fishermen to organize for their mutual welfare. The additional inducement of a Federal law authorizing the creation of cooperative marketing organizations is held out.

Relief for the commercial fisherman is one of the most emphatic demands of today. He seeks no more than has been done for those in other occupations but should have at least an even break.

COMMERCE AND INDUSTRY

Now that the country is well on the road to economic recovery, the continued industrial development of the State should receive more attention. Under conditions existing for the last several years, there was little expansion of manufacturing but with times improving the trend of industrial development to the South will doubtless be resumed. If North Carolina is to receive her full share and the benefit of new payrolls, she must be prepared to present her advantages to the world.

The function of the Division of Commerce and Industry is not filled by merely assembling information showing the opportunities offered by this State but it should be equipped to use this information to the best advantage. The services of an industrial engineer to represent the State in bidding for new industries and in expanding her commerce are needed.

The present is also an opportune time for launching a program to attract tourists to North Carolina. The State is most fortunate in having a variety and standard of scenic, recreational, and historic attractions exceeded by none. Through the wise expenditure of a small amount of money, millions of dollars that otherwise go elsewhere could be brought to North Carolina annually. Inexpensive tourist literature is badly needed. With the official opening of the Great Smoky Mountains not far away and with a program to mark the historical spots of the State contemplated, the next biennium is a most appropriate time for a modest program to let the world know of North Carolina's attractions.

FORESTRY

The "New Deal" with its various agencies such as the Civilian Conservation Corps, Civil Works Administration, Emergency Relief Administration, Public Works Administration, Soil Erosion Service, and Agricultural Adjustment Administration, has centered attention on the vital part which forests play in our civilization. These and other activities have advanced forestry more rapidly than during any period in the history of the country.

That North Carolina's forestry program has progressed at least a decade, as measured by the past, during the past biennium as a result of assistance from the various forestry activities of the Federal government is a conservative estimate. Had the Department been able to take full advantage of cooperation extended there is little doubt that further progress would have been made. We have been greatly handicapped through the lack of personnel necessary to plan and supervise projects for which federal funds would have been used.

Eleven Civilian Conservation Corps camps were allotted to supervision of the Department during the first year of existence of this organization. This number was reduced to eight for the third six-month camp period, largely because the State could not furnish the necessary supervisory and cooperative personnel.

Forest fire control has benefited tremendously from emergency conservation work. Nine new forest fire towers purchased from CCC funds and one from State Appropriations were erected by ECW crews during the biennium. The report of operations of State-directed CCC camps to the end of the biennium, showed, among other things, the cutting of 492.9 miles of truck trails, the construction of 524 bridges, and the completion of approximately 54.6 miles of telephone lines for connection of lookout and towers with ground forces.

For several years the Department has advocated the expansion of National Forest areas in North Carolina. A new purchase program authorized during the biennium calls for the eventual addition of some 2,000,000 acres to these holdings in the State.

One of the goals toward which the Department has looked for years is the establishment of a system of State Parks and Forests which would include outstanding scenic and recreational areas and which would turn submarginal and waste lands into timber production and demonstrations of scientific forestry practice. An opportunity for the creation of several units to such a system is offered through the Federal Land Use and Homestead Subsistence programs. Under plans proposed, a limited number of such areas will be purchased and developed by the Federal government and turned over to the State for administration. Such areas, recommended for purchase by the Department, should by all means be accepted as a valuable part of our land program.

The Department cooperated with other agencies in bringing the U. S. Soil Erosion project on the Deep River and Brown's Creek Watersheds to North Carolina. Efforts directed toward the control of soil erosion should be among the most valuable and lasting features of the "New Deal."

Reforestation has also been stimulated by relief measures. A badly needed nurseryman's cottage at the Department's forest nursery near Clayton was built by a side camp from one of the CCC units. In addition, this camp made possible the expansion of the capacity of the nursery from approximately 500,000 seedlings annually to approximately five times that number. New plant beds were built and labor was furnished for planting and caring for the beds.

GAME AND INLAND FISHERIES

By direction of the General Assembly of 1933, the offices of State Game Warden and Commissioner of Inland Fisheries were consolidated. John D. Chalk, a well known hunter and efficient executive, was chosen by the Board of Conservation and Development to fill the merged offices. Mr. Chalk began his new duties on April 15, 1934.

The consolidation of the two offices has worked out well, and has affected an economy and resulted in increased efficiency. It has brought two closely associated phases of wildlife conservation administered by the same field force under the direct supervision of one official.

During the latter part of the biennium, the collection of hunting and fishing license fees which had dropped to the lowest point since the passage of the game and angler's laws started on the upgrade. This is believed to have resulted from a combination of improved economic conditions and renewed activity on the part of the warden force. It will give additional funds with which to carry out a more constructive program for the protection and rehabilitation of game and inland fish.

Federal relief measures also provided means for permanent improvements and additions to the State game and fish plants. More than \$30,000 was spent on such projects by the Civil Works Administration. All of the State fish hatcheries shared in this work, either through expanding their capacities, repairs, or permanent improvements. A new State game farm to replace the abandoned plant at Asheboro was erected near Fayetteville and will be operated in conjunction with the Frank Stedman Hatchery at Lake Rim. Display and game breeding pens were built on the Mount Mitchell State game refuge in Mount Mitchell. Game reared there will be used for stocking various State refuges. Other improvements at the Mount Mitchell station include the building of trout rearing pools for stocking refuge streams.

Improved financial conditions made it possible to authorize an increase in pay for the wardens beginning with the new fiscal year, July 1, 1934. The remuneration of the wardens had been cut drastically to make it possible for the Division to operate within its receipts. It is expected that the increase in pay will be reflected immediately in increased activities.

MINERAL RESOURCES

In the past there has been entirely too much inclination to view North Carolina only as "Nature's Sample Case" for minerals. There is ample reason for such a reference to the minerals of the State but this should not result in overlooking the opportunity for development of many types that are found in commercial quantities. Species and sub-species of minerals numbering 289, said to be the largest number found in any one State, have been identified in North Carolina.

Returning prosperity has centered attention on mineral development. In this connection, for the sake of emphasis, it is appropriate to repeat an excerpt from the last biennial report of this Department: "Reports from competent engineers and geologists . . . show that North Carolina has the largest feldspar, sheet mica, residual kaolin clay, kyanite, corundum, monazite, tin, mica schist, pyrophyllite, spinel, garnet and granite deposits in the United States. Yet of this group of twelve minerals, only five are produced at the present time. In addition to the above, there are also large deposits of limestone, marble, marl; coal, both bituminous and anthracite; magnetic iron ore, sand and gravel, brick and tile clays, barite, talc,

soapstone and copper which have commercial possibilities. Also there occur several varieties of gem stones, some gold, lead and zinc, which offer possibilities."

An increase in the government valuation of gold from \$20.67 per ounce to \$35.00 per ounce has centered attention of possibilities for larger production of the precious metal in North Carolina. The extent of gold bearing deposits is shown from the fact that production has been recorded at some time in about two-thirds of the 100 counties in the State. The Federal government has assigned a field force to make a study of the deposits in North Carolina and the report should be interesting.

Work of the Division has been handicapped through the lack of facilities for investigating deposits of those minerals already produced on a commercial scale, not to mention those which give promise of development. Published information on these minerals is badly needed.

WATER RESOURCES

Stream gaging continues as the most extensive and fundamental function of this Division. By means of these operations basic data needed in the development of our power resources, municipal water supplies, sewage disposal and other uses of water are supplied.

Special Federal funds furnished through various agencies have also brought stream gaging facilities to the best condition in years. At the beginning of this report period, there were 71 gaging stations in operation, but only 48 of these were modern in design and equipment.

The latter year of the biennium witnessed the construction with Federal funds of 37 reinforced concrete recorder-type gaging stations. Of these 12 were placed at new locations, 3 are at locations where stations had previously been operated but had been discontinued, 16 replaced observer-type stations, and 5 replaced timber-type recorder stations in poor condition. In addition, 17 recorder timber stations were lined with reinforced concrete for permanency. This construction represents an expenditure of \$72,611.63. As a result of this program, there are now 84 stations in operation or under construction, the largest number ever operated in the State.

A reduced budget forced the suspension of several activities formerly carried on by this Division. One of the most important of these which should be continued and for which the need will probably be felt more keenly in the future is the stream sanitation and conservation program. As the development of industry continues and as population grows, the problems of disposal of industrial and domestic wastes multiply. The Department, in cooperation with the Board of Health, should be in a position to assist with the problem arising from these sources or the State must bear the consequences and pay a heavy penalty in the future.

A study of the chemical qualities of industrial waters of North Carolina was started by the Division several years ago and a preliminary report was issued. Information of this type is required in promoting the continued industrial development of the State.

This Division has been subjected to a considerable turn-over in personnel during the past biennium. Thorndike Saville, chief engineer since the establishment of the Division, resigned to accept the position of Professor of Hydraulic and Sanitary Engineering at New York University in September, 1932. He was succeeded by Chas. E. Ray, Jr., principal assistant engineer, who in turn resigned in July, 1933, to enter private business at Waynesville. H. D. Panton was appointed to fill the post after the departure of Mr. Ray.

MISCELLANEOUS

A project for the restoration of old Fort Raleigh on Roanoke Island, site of the first English settlement on the North American continent and birthplace of Virginia Dare, first child of English parents born in the New World, was among those approved by the Civil Works Administration.

The Roanoke Island Memorial Commission which had preserved the tract of land and the few remaining relics of the settlement deeded 16.4 acres to the State at the request of this Department and others interested in the project.

Frank Stick, of Manteo and Elizabeth City, was active in obtaining approval of this project, in research to obtain accurate records of the layout and buildings at the old fort, and in planning and directing the work. General supervision of the restoration has been under the Department of Conservation and Development. Restoration of the fort is now well under way.

This Department has been active in advocating the establishment of the Park-to-Park highway to connect the Great Smoky Mountains National Park and the Shenandoah National Park. It has also lent its support toward having the official entrance to the Great Smoky Mountains National Park in North Carolina. J. Q. Gilkey, vice-chairman of the Board of Conservation and Development, has served ably as chairman of the special committee appointed by Governor J. C. B. Ehringhaus, to present the State's claims for the park highway route.

With the active assistance of other groups and individuals, the Department has sought the establishment of a great recreational ground on the coast of North Carolina in the form of a National Park, Monument, or Forest. The project seeks Federal acquisition and development of a strip of 100 miles or more along the coast of the State with the construction of roads and bridges to give access to the general public. These plans include reforestation of "the banks," that narrow strip of land separating the Atlantic Ocean from the coastal sounds. Return of this area to timber production would not only reclaim much waste land but would form a barrier for the mainland against destructive storms.

One step toward the realization of this program was the establishment by the FERA of a camp for transients at Nags Head. Work of this group has been directed toward anchoring shifting sands as the first step in reforestation. It is still hoped that the Federal government may be interested in land acquisition and further development in this territory.

The Department helped obtain approval of a CWA project for the closing of a storm-cut inlet near Currituck lighthouse in Currituck County. Sea water entering this breach in the beach had affected adversely the fresh water aquatic growth which has made Currituck Sound one of the most attractive wintering grounds in the Nation for migratory wildfowl.

APPROPRIATION DIVISIONS

STATEMENT OF RECEIPTS AND DISBURSEMENTS
Biennium 1932-1934

	1932-33	1933-34
I. ADMINISTRATION:		
<i>Board of Conservation and Development:</i>		
Attending Meetings.....	\$ 702.94	\$ 137.90
<i>Director's Office:</i>		
Salary, Director.....	4,500.00	3,999.96
Salaries, Staff.....	7,635.88	3,694.00
Office Supplies.....	267.64	306.17
Postage, Telephone, Freight.....	892.19	661.87
Field Travel.....	553.65	363.39
Printing.....	507.71	102.96
Repairs.....	23.50	17.09
General Expense.....	229.74	135.14
Equipment.....	3.50	19.80
Total Expenditures.....	\$ 15,316.75	\$ 9,438.28
Less Receipts:		
Sale of Publications.....	33.96	42.40
Appropriation.....	\$ 15,282.79	\$ 9,395.88
II. WATER RESOURCES:		
Salary, Chief Engineer.....	\$ 2,331.25	\$ 2,100.00
Salaries, Staff.....	5,343.74	1,967.33
Salaries, Extra.....	1,226.08	50.00
Supplies and Materials.....	369.48	69.79
Postage, Telephone, Freight.....	379.97	137.07
Field Travel.....	1,033.17	50.19
Printing.....	373.37	40.07
Motor Vehicle Operation.....	698.90	359.36
Repairs.....	92.78	12.87
Cooperation with U. S. Geological Survey.....	8,555.23	3,056.14
General Expense.....	35.50	27.90
Equipment.....	77.93	4.64
Total Expenditures.....	\$ 20,517.40	\$ 7,875.36
Less Receipts:		
Private Cooperation.....	2,811.34	1,455.51
Appropriation.....	\$ 17,706.06	\$ 6,419.85
III. MINERAL RESOURCES:		
Salary, State Geologist.....	\$ 2,671.86	\$ 2,250.00
Salaries, Staff.....	1,237.50	1,050.00
Supplies.....	10.69	38.95
Postage, Telephone, Freight.....	41.30	43.20
Field Travel.....	1,327.82	994.57
Printing.....	15.72	7.83
Appropriation.....	\$ 5,304.89	\$ 4,384.55
IV. FOREST FIRE PREVENTION:		
Salaries, Staff.....	\$ 25,492.53	\$ 17,996.13
Workman's Compensation.....	283.78	1,168.37
Supplies and Materials.....	545.78	135.94
Postage, Telephone, Freight.....	1,468.45	1,676.90

STATEMENT OF RECEIPTS AND DISBURSEMENTS—Continued

Biennium 1932-1934

	1932-33	1933-34
V. FOREST FIRE PREVENTION—Continued		
Travel Expense.....	\$ 4,800.44	\$ 1,947.46
Printing.....	315.71	336.65
Motor Vehicle Operation.....	3,107.58	2,648.77
Lights.....	20.50	27.95
Repairs.....	72.89	41.56
General Expense.....	987.28	800.02
Equipment.....	1,987.81	1,542.60
Cooperative Projects:		
Salaries, Wardens.....	17,383.93	22,524.57
Wages, Fire Fighters.....	8,276.51	17,434.34
Travel Expense.....	3,378.64	3,733.98
Lookout Towers.....	242.00	1,162.49
Telephone Lines.....	1,021.10	1,017.44
Fire Control Equipment.....	1,500.47	2,626.29
Equipment Repairs.....	986.43	851.35
Cabins and Buildings.....	188.52	115.21
Total Expenditures.....	\$ 72,060.35	\$ 77,788.02
Less Receipts:		
Federal Cooperation.....	37,341.53	38,204.53
County Cooperation.....	16,042.88	20,035.54
Private Cooperation.....	2,774.05	4,299.67
Contribution from Game.....	13,299.85	11,000.00
Reserve for Compensation.....		500.00
Total Receipts.....	\$ 69,458.31	\$ 74,039.74
Appropriation.....	\$ 2,602.04	\$ 3,748.28
VI. GENERAL FORESTRY:		
Salary, State Forester.....	\$ 2,953.11	\$ 2,400.00
Salaries, Staff.....	1,125.00	826.80
Supplies and Materials.....	46.89	51.40
Postage, Telephone, Freight.....	126.41	109.70
Field Travel.....	169.98	164.03
Printing.....	15.58	13.22
Equipment.....	19.14	12.66
	\$ 4,456.11	\$ 3,577.81
State Forests and Parks:		
Salaries, Staff.....	\$ 1,334.07	\$ 1,271.33
Supplies and Materials.....	20.50	1.79
Postage, Telephone, Freight.....	23.41	9.42
Field Travel.....	27.52	29.43
Printing.....	1.39	7.91
Legal Costs.....	15.00	40.00
Repairs.....	10.00	55.07
Motor Vehicle Operation.....	28.72	36.94
	\$ 1,460.61	\$ 1,451.89
Forest Planting:		
Salaries, Staff.....	\$ 4,553.16	\$ 729.36
Supplies and Materials.....	254.73	308.01
Postage, Telephone, Freight.....	59.97	89.65

STATEMENT OF RECEIPTS AND DISBURSEMENTS—Continued
Biennium 1932-1934

	1932-33	1933-34
VI. GENERAL FORESTRY—Continued		
Field Travel.....	\$ 26.35	\$ 35.30
Printing.....	3.90	3.75
Motor Vehicle Operation.....	274.48	199.49
Equipment.....	6.60	13.00
	\$ 5,179.19	\$ 1,378.56
Total Expenditures.....	\$ 11,095.91	\$ 6,408.26
Less Receipts:		
Federal Cooperation.....	2,360.00	941.06
Private Cooperation.....	12.36	55.00
Sale of Seedlings.....	711.94	522.51
Sale of Publications.....	32.00	20.34
Permits, Lakes.....	220.25	107.25
Park Concessions.....	61.35	87.70
Total Receipts.....	\$ 3,397.90	\$ 1,733.86
Appropriation.....	\$ 7,698.01	\$ 4,674.40
Total Department:		
Expenditures.....	\$ 124,295.30	\$ 105,894.47
Less Receipts.....	75,701.51	77,271.51
Appropriation.....	\$ 48,593.79	\$ 28,622.96
DIVISION OF GAME AND INLAND FISHERIES		
VII. INLAND FISHERIES:		
<i>Administration:</i>		
Salary, Assistant Director.....	\$ 3,515.61	\$ 1,257.76
Salaries, Staff.....	1,012.50	802.50
Salaries, Wardens.....	825.00	300.00
Commissions, Wardens.....	4,185.18	2,768.35
Office Supplies.....	46.49	
Postage, Telephone, Freight.....	212.79	100.25
Field Travel.....	160.03	76.35
Printing.....	388.74	357.76
Publicity Service.....	19.60	14.10
Legal Costs.....	33.60	5.00
Fire Insurance.....	57.00	284.50
Workman's Compensation.....	35.00	
	\$ 10,491.54	\$ 5,966.57
<i>Morrison Hatchery (Balsam):</i>		
Salary, Superintendent.....	\$ 1,406.25	\$ 1,200.00
Salaries, Staff.....	1,237.50	900.00
Feed and Supplies.....	1,827.95	2,400.25
Postage, Telephone, Freight.....	69.77	76.59
Field Travel.....	10.00	11.54
Motor Vehicle Operation.....	194.13	133.52
Lights.....	73.12	92.00
Repairs.....	55.24	34.60
Equipment.....	192.00	
	\$ 5,065.96	\$ 4,848.50

STATEMENT OF RECEIPTS AND DISBURSEMENTS—Continued
Biennium 1932-1934

	1932-33	1933-34
VII. INLAND FISHERIES—Continued		
<i>Murphy Hatchery (Marion):</i>		
Salary, Superintendent.....	\$ 1,012.50	\$ 800.00
Salaries, Staff.....	300.00	
Feed and Supplies.....	1,078.82	1,684.81
Postage, Telephone, Freight.....	3.00	21.62
Motor Vehicle Operation.....	194.29	286.45
Repairs.....	252.51	340.21
	\$ 2,841.12	\$ 3,133.09
<i>Stedman Hatchery (Fayetteville):</i>		
Salary, Superintendent.....	\$	\$ 800.00
Salaries, Staff.....	996.00	360.00
Feed and Supplies.....	549.37	730.60
Postage, Telephone, Freight.....	86.59	129.79
Field Travel.....	4.30	7.10
Motor Vehicle Operation.....	526.00	513.17
Repairs.....	149.47	111.69
Equipment.....	6.23	
	\$ 2,317.96	\$ 2,652.35
<i>Roaring Gap Hatchery:</i>		
Salary, Superintendent.....	\$ 920.00	\$ 800.00
Salaries, Staff.....	120.00	
Feed and Supplies.....	929.96	1,232.16
Postage, Telephone, Freight.....	5.55	8.10
Motor Vehicle Operation.....	166.09	242.29
Repairs.....	85.49	74.34
Lights.....	57.40	72.08
Equipment.....		8.00
	\$ 2,284.49	\$ 2,436.97
<i>Boone Hatchery:</i>		
Salary, Superintendent.....	\$ 1,012.50	\$ 800.00
Salaries, Staff.....	562.50	360.00
Feed and Supplies.....	1,458.20	1,936.18
Postage, Telephone, Freight.....	10.00	
Motor Vehicle Operation.....	149.11	106.13
Repairs.....	21.80	22.40
Equipment.....	10.00	10.00
	\$ 3,224.11	\$ 3,234.71
Total Fisheries Division.....	\$ 26,225.18	\$ 22,272.19
VIII. GAME DIVISION:		
<i>Administration:</i>		
Salary, Commissioner.....	\$ 3,515.61	\$ 2,675.45
Salaries, Staff.....	12,290.61	10,325.00
Salaries, County Wardens.....	50,940.62	28,475.08
Office Supplies.....	332.69	214.30
License Buttons.....	2,509.60	2,705.45
Postage, Telephone, Freight.....	965.41	1,216.84
Field Travel.....	5,729.47	5,625.18
Printing Forms and Licenses.....	1,535.35	2,182.54
Motor Vehicle Operation.....	357.69	463.61

STATEMENT OF RECEIPTS AND DISBURSEMENTS—Continued
Biennium 1932-1934

	1932-33	1933-34
VIII. GAME DIVISION—Continued		
Repairs.....	\$ 12.75	\$ 76.54
Publicity Service.....	43.09	40.28
Court Costs.....	70.25	27.67
Insurance and Bonding.....	307.50	1,116.20
Equipment.....	236.50	42.38
	\$ 78,847.14	\$ 55,186.52
<i>Game Farm (Asheboro):</i>		
Salary, Superintendent.....	\$ 1,687.50	\$ 940.00
Salaries, Staff.....	1,138.67	80.00
Feed and Supplies.....	3,343.92	1,073.96
Postage, Telephone, Freight.....	150.35	78.75
Travel Expense.....	85.95	
Motor Vehicle Operation.....	174.78	257.44
Lights, Power, Water.....	167.57	232.19
Repairs.....	153.62	22.93
Fair Exhibits.....	76.02	85.77
Medical Service.....	36.00	23.00
Equipment.....	351.71	119.10
	\$ 7,366.09	\$ 2,913.14
<i>Game Farm (Fayetteville):</i>		
Salary, Superintendent.....		\$ 470.00
Labor.....		60.00
Feed and Supplies.....		429.86
Motor Vehicle Operation.....		87.63
Equipment.....		526.09
		\$ 1,573.58
<i>Game Farm (Mt. Mitchell):</i>		
Feed and Supplies.....		\$ 448.54
Repairs.....		112.09
Moving Equipment.....		249.33
Equipment.....		454.74
Buildings.....		446.86
		\$ 1,711.56
<i>Refuges, General:</i>		
Salary, Superintendent.....	\$ 1,406.25	\$ 1,200.00
Salaries, Staff.....	364.37	
Supplies and Materials.....	15.08	428.23
Postage, Telephone, Freight.....	41.53	35.83
Travel Expense.....	234.49	130.59
Office Rent.....	161.50	102.25
Purchase of Game.....	80.15	30.44
Motor Vehicle Operation.....	510.55	477.79
Motor Vehicle Exchange.....	479.00	
Fire Fighting.....		90.34
	\$ 3,292.92	\$ 2,495.47

* Discontinued.

STATEMENT OF RECEIPTS AND DISBURSEMENTS—Continued
Biennium 1932-1934

	1932-33	1933-34
VIII. GAME DIVISION—Continued		
<i>Mt. Mitchell Refuge:</i>		
Salaries, Wardens.....	\$ 1,740.00	\$ 1,160.00
Feed and Supplies.....	204.32	-----
Wiring Refuge.....	44.60	-----
Repairs.....	60.66	-----
	\$ 2,049.58	\$ 1,160.00
<i>Daniel Boone Refuge:</i>		
Salaries, Wardens.....	\$ 1,081.25	\$ 555.00
Feed and Supplies.....	98.71	-----
Wiring Refuge.....	45.00	-----
	\$ 1,224.96	\$ 555.00
<i>Wayah Bald Refuge:</i>		
Salaries, Wardens.....	\$ 731.25	\$ 600.00
Feed and Supplies.....	113.34	-----
Wiring Refuge.....	17.43	-----
	\$ 862.02	\$ 600.00
<i>Sauratown Refuge:</i>		
Salaries, Wardens.....	\$ 675.00	\$ 200.00
Feed and Supplies.....	15.06	-----
	\$ 690.06	\$ 200.00
<i>Guilford Refuge:</i>		
Salaries, Wardens.....	\$ 675.00	\$ 360.00
Feed and Supplies.....	78.75	3.90
Rent of Building.....	150.00	150.00
	\$ 903.75	\$ 513.90
<i>Holly Shelter Refuge:</i>		
Salaries, Wardens.....	\$ 542.50	\$ 480.00
<i>Roaring Gap Refuge:</i>		
Salaries, Wardens.....	\$ 450.00	\$ 360.00
Feed and Supplies.....	16.60	-----
	\$ 466.60	\$ 360.00
<i>P. R. Camp Refuge:</i>		
Salaries, Wardens.....	\$ 450.00	\$ 360.00
<i>Andrew Johnson Refuge:</i>		
Salaries, Wardens.....	\$ 480.00	-----
Feed and Supplies.....	13.85	-----
Repairs.....	27.85	-----
	\$ 521.70	-----
<i>Hanes Lassiter Refuge:</i>		
Salaries, Wardens.....	\$ 1,625.00	\$ 540.00
Feed and Supplies.....	4.05	-----
Motor Vehicle Operation.....	353.15	106.50
	\$ 1,982.20	\$ 646.50

STATEMENT OF RECEIPTS AND DISBURSEMENTS—*Continued*
Biennium 1932-1934

	1932-33	1933-34
VIII. GAME DIVISION— <i>Continued</i>		
<i>Miscellaneous Accounts:</i>		
Bounties.....	\$ 7.35	\$ 10,000.00
Contribution to Fire Control.....	13,299.85	11,000.00
Workman's Compensation.....	82.32	1,346.40
	\$ 13,374.82	\$ 22,346.40
Total Game Division.....	\$ 112,574.34	\$ 91,102.07
Total Requirements.....	\$ 138,799.52	\$ 113,374.26
Less Receipts:		
Sale Angler's Licenses.....	24,661.56	21,389.45
Sale Hunter's Licenses.....	123,044.12	116,253.98
	\$ 147,705.68	\$ 137,643.43
Balance to Succeeding Year.....	\$ 8,906.16	\$ 24,269.17

DIVISION OF COMMERCIAL FISHERIES

INTRODUCTION

The fishing industry has suffered one of the greatest set backs in the history of this Department on account of the depression. There have been just as many food fish caught during this biennium, but due to the low price received, the fishermen have barely been able to exist much less keep their boats and nets up to standard. Therefore, much of their equipment is in bad condition.

During the night of September 15, 1933, there was the worst hurricane ever known on this coast and as a result at least one-half of the nets were destroyed and one-half of the boats damaged. This loss to the fishermen has naturally been reflected in the service rendered to the industry by this Division because it is allowed no appropriation. Receipts have dropped more than fifty per cent below normal because of the damage done the fishermen by unfavorable market conditions and storms.

FOOD FISH

Food fish is the most extensive branch of our industry as it covers all the coastal sections of the State. In most sections it is carried on the year round and furnishes employment to thousands, who otherwise would find it difficult to make a living, particularly during these years of financial stringency. The past shad and herring season has been the best we have had for ten years, and we attribute this principally to the opening of New Inlet by the August storm. The fish have had easy access from the ocean through this inlet on our northeast coast to the sounds and rivers in that section, which accounts for the favorable condition in this phase of our industry. There have been caught 65,080,332 pounds of food fish at a value of \$1,507,756.56 during this biennium. Undoubtedly more fish would have been taken had the fishermen had their regular equipment and the price of their product been normal.

SHRIMP

Shrimping is a local activity and is confined to two counties, Brunswick and Carteret. The former produced a great many more up until the last season which was the best Carteret has ever experienced. No particular reason why there should have been more shrimp off Beaufort Inlet the past season than ever before is known, except that the hurricane completely cut away the Cape Lookout Shoals and they came in around the beach when heretofore they went around the shoals. Ordinarily, they have not struck into Beaufort Inlet but in further south and in the Cape Fear River. During the past biennium the State produced 1,528,511 pounds of shrimp at a value of \$91,710.66.

MENHADEN

This is strictly an activity under the control of capital. The factory, with its boats and equipment, costs many thousands of dollars; but there is no guarantee that any operator will make even interest on his investment during any given year.

This phase of the industry differs from any other in that the fishermen risk only their labor; in all other phases, they furnish their own equipment. As a rule the season lasts only a couple of months, from the middle of October to the middle of December, and then the catch depends on the weather. The fish are caught at sea and at the season of the year when the weather is least dependable. Menhaden are migratory, and they pass the North Carolina coast during the fall season on their way south. During the past biennium 114,433,000 menhaden were caught, which sold locally for \$507,667.00. From this total catch 571,667 gallons of oil, valued at \$114,333.00, were manufactured and scrap in the amount of 8,167 tons, valued at \$393,334.00 was manufactured. The investment in the industry is approximately \$250,000.00 in boats, \$30,000.00 in nets and equipment, and in addition to this, \$450,000.00 in factories.

OYSTERS

This branch of the sea food industry suffered more from the hurricane of September, 1933, than any other. The terrific winds and waves either blew ashore or covered with sand at least seventy-five per cent of the oysters on our best bottoms. With its limited funds, this Division would have been helpless to remedy this situation; but through the good offices of the CWA and ERA, up to the end of the fiscal year 774,038 bushels of oysters and shells have been returned to suitable waters and it is hoped this good work may be continued at least through the present season. This, with proper supervision and patrolling, should put the industry back on a profitable basis within two or three years.

The above planting was done at a cost of \$62,715.69, or an average of .081 per bushel, which, all things considered, is a most satisfactory showing. By looking after these and the encouragement of the cultivation of private oyster gardens and farms, the Division hopes within a reasonable time to see the oyster industry in North Carolina come into its own. Rated by the medical profession as among the most valuable of foods, if oysters are properly handled and marketed, there should be no question of demand; and with at least a million acres of unsurpassed oyster bottoms, if the coastal population could be instructed as to their cultivation and conservation, there should be no question of supply. The State produced during the past biennium 300,628 bushels of oysters at a value of \$75,157.00.

CLAMS

The clam is a very palatable and desirable dish. It is becoming more popular with the general trade and thus the demand is increasing. Core Sound is producing this bivalve in much greater quantities because of the inlets broken through the beach by the September storm of last year. Thousands of bushels of clams are being carried out of our State from this Sound by out-of-State trucks. This provides a livelihood for scores of people during the dull season of the year. The production of clams in commercial quantities is restricted to the waters of Brunswick, Carteret, Pender and Onslow counties. A few are caught in Hyde and Dare counties. During the past biennium the production was 62,708 bushels at a value of \$62,708.00.

ESCALLOPS

This at one time was one of the most valuable phases of the fishing industry, which happens to be confined strictly to the waters of Carteret County. But during the last three seasons the fishermen have received practically nothing from this

source. For some mysterious reason the grass on which geese and ducks feed and that to which the scallop spat attaches itself, was killed out along the Atlantic Coast even into Canada; and, as a result, there have been no scallops in commercial quantities on our regular grounds. When the grass returns and if the Division is in the position to do so, scallops should be planted to other North Carolina waters, thus enlarging the yielding territory. There appears to be no reason why scallops should not thrive almost anywhere in waters of the State which have the same salinity as that on present producing grounds and where there is suitable quantities of grass. Anyway, the matter is important enough to risk the outlay necessary to transplant a few thousand bushels for experimental purposes. During this biennium only 2,137 gallons of scallops with a value of \$2,137 were marketed as against a production of 67,759 gallons valued at \$67,759 for the previous corresponding period.

CRABS

The soft shell crab holds a unique place in the fishery industry in that it is caught in commercial quantities only in Carteret County. During the months of March and April this activity feeds a large number of people who depend very largely on it from year to year for a livelihood. The State produced in the past biennium 150,938 dozens of crabs at a value of \$113,203.50. The hard or blue crabs are found all along the coast and during the past season more were produced and sold than in any previous five-year period. This was not because of any increase in quantity of crabs in the waters of the State, but to the freeze during the month of February that killed the crabs in Chesapeake Bay. The increased demand has meant a lot to our fishermen as it has supported their families during the whole spring and summer. The State has produced in the past biennium 300,000 bushels of blue crabs at a value of \$120,000.00.

REPORT OF SANITARY ENGINEER

CAPTAIN J. A. NELSON,
*Fisheries Commissioner,
Morehead City, N. C.*

DEAR SIR:

I present herewith a report of the shellfish sanitation work conducted by this office during the last biennium. At the beginning of this biennium a full-time Sanitary Engineer was employed to take charge of the sanitation of the shellfish industry.

During the first quarter of the fiscal year 1932-33, a complete survey of the waters adjacent to Morehead City and Beaufort was made in coöperation with the U. S. Public Health Service to determine if the existing restriction lines for taking clams and oysters were safe and to see if any adjustments should be made in these lines. From the results of this survey, it was deemed necessary to draw up new restriction lines and designate these lines by stake markers. Following this work, a similar survey was made of the waters in the Wrightsville Sound area with adjustments being made in the old lines. In July, 1934, a sanitary survey was made of Silver Lake, Ocracoke Island, which resulted in the closing of this body of water for the taking and bedding of clams and oysters.

There have been great improvements during this biennium in the sanitation of oyster shucking houses. New plants have been built in areas where illicit shucking and packing were practiced heretofore. Standard plants for shucking houses have recently been gotten out by this office to insure a more uniform type of plant in the future.

A survey of the crab meat plants during the summer of 1933, showed this industry to be in great need of sanitary regulation and supervision. In coöperation with the U. S. Food and Drug Administration, rules and regulations governing the crab meat

industry were formulated and approved at the winter meeting of the Board of Conservation and Development. Excellent progress is being made in this industry, which is centered around Belhaven and Washington and gives employment to several hundred workers.

A. B. FREEMAN,
Assistant Sanitary Engineer.

DIAMOND BACK TERRAPIN

This industry lost its value on account of prohibition. This may sound strange, but, as a matter of fact, terrapin was served at beer parties, which increased the demand for this shellfish. It has come into its own again since the repeal of prohibition. They are now bringing better prices again and there will be no trouble to supply the demand as they are more numerous in the State than for many years. Much of this increase in supply may be credited to the Bureau of Fisheries at Beaufort, N. C., which has been planting in North Carolina waters from five to ten thousand small diamond back terrapin every year. Measures initiated by this Division for the protection of the diamond back have apparently been successful.

PATROL BOATS

The territory the Division's boats have to patrol is vast and much greater than the average person may think. When we take in the whole coast and rivers it amounts up to hundreds of square miles of territory. The *John A. Nelson*, the largest of our fleet, is stationed at Morehead City and is used by the Commissioner for general supervision in the sounds. It is used in the ocean at Ocracoke and Hatteras during the winter months to look after the out-of-State trawlers. The *Roanoke*, the speed boat, is also located at Morehead City and is used by one of the inspectors for collecting licenses and patrolling the closed territories where oysters and clams are not allowed to be taken. The *Pamlico* has its headquarters at Swan Quarter and is used by one of the Assistant Commissioners for patrolling Pamlico Sound. The *Albemarle* is stationed at Manteo and is used by another Assistant Commissioner, who has charge of staking off fishing limits, enforcing the law and collecting licenses in the lower Albemarle Sound and upper Pamlico Sound. The *Chowan* is stationed at Edenton and is used by one of the inspectors at that point. He patrols the waters of upper Albemarle Sound, Chowan, Roanoke, Perquimans, Cashie and Scuppernon Rivers, collecting licenses and enforcing the fishing regulations. These boats should be on duty the year round to keep the fishermen informed of the regulations and laws, as well as to protect the industry against would-be violators.

KIND, QUANTITY AND VALUE OF FISH TAKEN IN WATERS OF NORTH CAROLINA
For the Period July 1, 1932, to June 30, 1934

Kinds of Fish	No. of Pounds	Value
Trout.....	6,000,000	\$ 150,000.00
Sea Mullet.....	900,000	13,500.00
Blue Fish.....	850,000	25,500.00
Mullet.....	1,500,000	45,000.00
Croakers.....	12,000,000	120,000.00
Spots.....	2,500,000	50,000.00
Hogfish.....	400,000	8,000.00
Mackerel.....	300,000	15,000.00
Shad.....	5,000,000	500,000.00
Herring.....	30,000,000	300,000.00
Butters.....	700,000	21,000.00
Carp.....	408,000	16,320.00
Flounders.....	600,000	24,000.00
Rock.....	800,000	80,000.00
Drum.....	310,000	9,300.00
Perch.....	600,000	36,000.00
Assorted.....	900,000	27,000.00
Cats.....	400,000	20,000.00
Eels.....	50,000	1,500.00
Jack.....	400,000	20,000.00
Pike.....	25,000	1,250.00
Bass.....	12,332	986.56
Pompano.....	10,000	1,000.00
Sea Bass.....	400,000	20,000.00
Sturgeon.....	10,000	2,000.00
Sheephead.....	5,000	400.00
Total Food Fish.....	65,080,332	\$ 1,507,756.56
Shrimp.....	1,528,511	91,710.66
Menhaden (No. of Fish).....	114,433,000	507,667.00
Total Value of Fin Fish.....		\$ 2,107,134.22

SHELLFISH

Oysters.....	300,628 (Bushels).....	\$ 75,157.00
Clams.....	62,708 (Bushels).....	62,708.00
Escallops.....	2,137 (Gallons).....	2,137.00
Soft Shell Crabs.....	150,938 (Dozens).....	113,203.50
Crab Meat.....	300,000 (Pounds).....	120,000.00
Total Value of Shellfish.....		\$ 373,252.00

TOTALS

Value of Fin Fish.....	\$ 2,107,134.22
Value of Shellfish.....	373,252.00
Total Value Water Products.....	\$ 2,480,386.22

STATEMENT OF RECEIPTS AND DISBURSEMENTS OF THE DIVISION OF COMMERCIAL
FISHERIES, DEPARTMENT OF CONSERVATION AND DEVELOPMENT

For Biennium 1932-33—1933-34

	1932-33	1933-34
ADMINISTRATION AND INSPECTION:		
Commissioner's Salary.....	\$ 3,093.75	\$ 2,967.00
Assistant Commissioners and Inspectors.....	4,546.54	5,650.50
Office Staff.....	1,770.00	1,800.00
Office Supplies.....	209.59	212.99
Postage and Box Rent.....	110.83	172.68
Telephone and Telegrams.....	165.66	193.70
Traveling Expenses Commissioners.....	158.40	257.59
Printing and Binding.....	262.78	404.27
Motor Vehicle Operation.....	674.64	1,045.64
Office Rent.....	925.00	700.00
Counsel Fees.....	346.00	275.00
Insurance and Bonding.....	82.20	121.00
Equipment.....		
Other Expenses.....	382.50	232.50
Total.....	\$ 12,727.89	\$ 14,032.87
PATROL BOATS:		
Salaries and Wages.....	\$ 627.50	\$ 1,310.65
Supplies.....	330.89	1,044.74
Gas and Oils.....	555.64	1,032.92
Repairs.....	847.77	1,079.44
Equipment.....		362.87
Subsistence.....	663.50	547.00
Docks and Warehouses.....	13.40	196.50
Marking Fishing Limits.....	434.76	271.75
Fire Insurance on Boat—John A. Nelson.....	130.00	130.00
Total.....	\$ 3,603.46	\$ 5,975.87

STATEMENT OF RECEIPTS AND DISBURSEMENTS OF THE DIVISION OF COMMERCIAL
FISHERIES, DEPARTMENT OF CONSERVATION AND DEVELOPMENT—Continued

For Biennium 1932-33—1933-34

	1932-33	1933-34
SHELLFISH SANITATION:		
Salaries and Wages.....	\$ 1,427.50	\$
Supplies and Materials.....	68.05	88.23
Total.....	\$ 1,495.55	\$ 88.23
TERRAPIN HATCHERY:		
Salaries and Wages.....	\$ .....	.....
Supplies and Materials.....	46.20	.....
Total.....	\$ 46.20	.....
Total Expenditures.....	\$ 17,873.10	\$ 20,096.97
Less Receipts.....	15,902.53	20,105.30
Credit Balance.....	\$	\$ 8.33
Owed Contingency and Emergency Fund.....	1,970.57	.....
RECEIPTS:		
Food Fish Licenses and Taxes.....	\$ 5,935.89	\$ 8,483.25
Oyster Licenses and Taxes.....	5,497.44	3,997.35
Escallop Licenses and Taxes.....	66.90	46.45
Clam Licenses and Taxes.....	1,422.60	1,848.48
Crab Licenses and Taxes.....	975.50	1,619.72
Menhaden Licenses.....	217.50	2,616.75
Power Boat Licenses.....	578.00	292.00
Other Sources.....	1,208.70	1,201.30
Total.....	\$ 15,902.53	\$ 20,105.30

DIVISION OF COMMERCE AND INDUSTRY

Operations of this Division have been curtailed materially during the biennium just closed because of the reduction of personnel and lack of funds with which to carry on its regular activities.

At the beginning of the biennium, the personnel of the Division included the chief, a statistician, and one stenographer. The statistician and stenographer resigned before the end of the first year of the biennium to accept employment elsewhere; and, because of financial limitations, it was not possible to replace them. Stenographic services were, however, provided through a transfer in the Department.

Under conditions cited above, the work of the Division has naturally been restricted from that of previous years; but every service previously offered has been maintained in some form. The Division, however, has not been able to meet all demands placed upon it under the restricted scope of operations and limited personnel. It has maintained all activities in the hope that its usefulness may be preserved and extended to meet the public demands.

The Division of Commerce and Industry is the only Departmental agency in the State charged with the responsibility of promoting the industrial and commercial development. It is a service organization for industry and represents the State in efforts to promote further development. This agency should be placed in a position which will enable it to give more useful service.

Following the general plan of the report immediately preceding, the activities of the Division will be covered under the four principal headings into which its duties are divided: I. Educational; II. Statistical; III. Promotional; and IV. Miscellaneous.

I. Educational. This phase of the Division's work includes the responsibility for the general educational program of all phases of conservation coming under the direction of the Department. Since conservation is largely an educational process, this type of activity is fundamental to progress.

Press: The press provides one of the chief means of disseminating educational materials from the Department. Distribution of articles, features, and materials to the press has been continuous throughout the biennium, hundreds of items being sent out throughout the State and country.

These articles have a double purpose—information concerning the activities of the Department and educational data designed to stress the importance of the program to the people of the State with an endeavor to enlist public coöperation.

Frequent requests from the press of North Carolina and other States for information concerning conservation activities and subjects of general interest to the State have been met by the Division. Every effort is made to keep up-to-date files and general information with which to meet these demands. By this means considerable favorable publicity has been given to North Carolina.

The Department wishes to extend a word of appreciation to the press of North Carolina for its whole-hearted coöperation in the use of information and educational copy prepared by the Division. Without the coöperation from this source much that has been accomplished would have been impossible.

Radio: During the first several months of the biennium, the Division, with the assistance of the personnel of the Department, filled a regular weekly schedule of

conservation talks on Radio Station WPTF at Raleigh. These talks reviewed the work of the Department and were educational in nature.

The schedule was discontinued when the personnel of the Department was reduced to such an extent as to make its continuation impracticable. The management of the station has offered again to schedule a regular weekly program of conservation addresses and it is hoped that they may be resumed in the near future. However, since the regular schedule of the Department has been suspended the Division has been represented at fairly frequent intervals on the program of the Wake County Chapter of the Izaak Walton League of America.

Broadcasting materials have been prepared for various other stations in North Carolina during the biennium, all of which have been liberal in allotment of time. It is believed that the series of forest fire warnings inaugurated several years ago as a caution against careless handling of fire during periods of high hazards has been of particular value in preserving one of the most valuable resources of the State. These warnings are in the form of short bulletins read at intervals throughout the day by the announcers.

Photographs: One of the most effective means of emphasizing a point is by use of illustrations. Timely photographs are accepted by the press throughout the country when reading material would not be considered. For several years the Division engaged in assembling a file of photographs of its activities and of general scenes for publicizing the State.

During the past biennium, few photographs have been obtained and the files of the most desirable ones have been almost depleted. A small appropriation for assembling a new collection of representative photographs in North Carolina would be a sound investment for the State.

Soon after the inauguration of the Civil Works program the Department joined hands with the N. C. Photographers Association in an effort to obtain approval of a photographic project. The CWA was terminated, however, before the approval could be obtained. Had its sponsors been successful in their efforts, the Department would have been enabled to assemble a file of valuable photographs. Under the plans for the project, a group of unemployed photographers would have collected a set of photographs requested by the Department. The prints and negatives would have become the permanent property of the Department.

II. Statistical. Among other things the act creating the Department of Conservation and Development directs it "to collect and classify the facts derived from investigations and from other agencies of the State as a source of information easily accessible to the citizens of the State and to the public generally, setting forth the natural, economic, industrial and commercial advantages of the State." The Division endeavors to carry out this mandate. It has been constantly engaged in the collection of statistics but its limited facilities have prevented the publication of these data.

This phase of the Division's work has suffered severely from curtailments. No new features have been undertaken, but the files of information have been maintained although it has not been possible to arrange them in the most efficient system.

Even during times of restricted operations and reduced facilities, the calls on the Division for service have not slackened. Often it has been necessary to devote only a small portion of the effort required for satisfactory service because the time for thoroughness has not been available.

The Division has started the revision of the industrial directory which was issued several years ago but which has been out of print for some time. Scores of requests

for this publication that could not be supplied have been received during the past biennium but it is expected that the revision may be ready for issuance within a few months.

Files of data for each North Carolina County and for every State which were set up several years ago are being continued and kept up to date as nearly as possible. General statistics concerning virtually every phase of activity in the State are kept on file in the Division. These are used for comparative purposes and for general distribution on request.

III. Promotional Activities. For several years preceding the report biennium, the Division has promoted the annual observance of "Made-in-North Carolina Week." This occasion had the dual purpose of informing North Carolinians of the various types of manufacturing carried on in the State and of advertising her products to the outside world.

The program has furnished the climax and focal point of the Division's effort to stimulate the industrial growth and commercial expansion of the State. The general purpose of the project included the creation of new markets for manufacturing establishments already operating in North Carolina. It also pointed out clearly the lines of industry which had already apparently reached their peak in profitable development and others for which there appeared to be ample room for sound expansion.

During the past biennium, the Division has been unable to continue the promotion of observance of "Made-in-North Carolina Week" but it is hoped that the resumption of the program may be possible next biennium.

The Division has continued to advocate the adoption of an attractively designed label for products made in the State. With articles manufactured in the State finding an outlet throughout the world it is believed that a tremendous amount of valuable advertising would be obtained by identifying North Carolina as their source.

Garment-Making: Observance of "Made-in-North Carolina Week" has brought out the fact that the State has few garment-making plants in spite of the fact that it is the largest producer in the nation of many of the materials used in their manufacture. During the last few years several plants of this nature have been established in North Carolina and it is believed that there are wide opportunities for others.

Food Processing: Another line of manufacturing for which North Carolina has been found to be suitable is the processing of food. The "Live-at-Home" program sponsored by former Gov. O. Max Gardner emphasized this fact and there has been some progress along this line.

The Federal Emergency Relief Administration has established a number of plants in North Carolina for the purpose of processing foods for distribution to those on relief rolls in the State. These have not only provided immediate relief but have demonstrated that an outlet could be obtained for huge quantities of locally processed foods in the State. This Division hopes that the food processing industries may be greatly expanded and will continue to direct its efforts toward that goal.

IV. Miscellaneous Activities. A variety of activities, all of which cannot be enumerated in limited space, comes under this head. The Division is a clearing house for general information concerning North Carolina and endeavors to furnish something of interest to every inquirer.

Tourist Advertising: No State has been more freely blessed with Nature's attractions than has North Carolina, but others with less to offer have profited to a much greater extent than has this State from such resources.

This Division is fully convinced that a limited amount of funds could be spent effectively in interesting the hundreds of thousands of tourists of the country in the scenery, climate, and historic background of North Carolina. Her recreational facilities might be enjoyed by thousands more than come to the State at present if they were informed of these attractions. A small advertising fund would attract thousands of new visitors, many of whom would make their permanent homes here later to North Carolina.

One of the greatest needs of the Division is the publication of a travel guide of the State which would show prospective tourists the location of the most outstanding points of scenic, historic and recreational interest. In spite of the fact that no advertising of North Carolina's attractions has been done, hundreds of voluntary requests for information concerning places to go and things to see in the State are received each biennium from not only this country but from many parts of the world.

An inexpensive travel guide of the State would furnish the principal information desired by these prospective tourists. At present there is no literature with which to meet such requests and the State is losing many prospective tourists who are attracted elsewhere.

Manuscript has been prepared by the Division for a highway tourist guide for several years but funds for its publication have not been available. Printing funds requested for the coming biennium would supply the means for the issuing this much needed piece of literature. It is the plan of the Department to distribute this map through regular tourist organizations throughout the nation and to supply it upon request from individuals, if means are provided for its publication.

Something of what North Carolina is missing by not capitalizing upon her tourist attractions may be seen from the fact that 153 agents arranging all expense tours in 1933 did not direct a dime of \$76,000,000 spent by this group to North Carolina. Several million dollars of this amount naturally should have come to this State had some effort been made to attract it. North Carolina unquestionably could offer visitors fully as alluring scenery, climate, and recreation as those states capturing the greater share of the huge expenditures by tourists. It is estimated that vacationists spend approximately four billions of dollars annually in the United States. North Carolina receives only a small proportion of this in comparison to what she might draw.

Facts About North Carolina: Outstanding facts about the State were assembled several years ago for a printed sheet under this title. So great has been the demand for this literature that there were several reprints.

When funds were no longer available for printing new issues the Division resorted to mimeographing and thousands of copies in this form have been circulated within and outside of the State. It is the most popular piece of literature issued by the Division and is frequently the only material available to meet requests. The sheet should again be printed in revised form.

DIVISION OF FORESTRY

There has probably been more discouragement and more encouragement in forestry during the past biennium than for any previous period in the history of the State. The reduction of the appropriated funds by the Budget Commission followed by the General Assembly's cutting to the bone with consequent reduction in personnel and activities threatened to throw the forestry work of the State back to its status of twenty years ago. Realizing, however, that the condition and the attempted economic remedy were temporary, the Forestry Division carried on with such means as were available. The rise of the Reconstruction Program under our new President, Franklin Delano Roosevelt, who was thoroughly forestry-minded and, like the former Roosevelt, strongly emphasized conservation, not only revived the courage of the Department but furnished an opportunity to develop educational and physical improvements, so that with reduced personnel the greatly increased work was cheerfully undertaken.

Since it was early decided that practically all Federal coöperation with the State in forestry work should be handled through the State Forester's office any report of the activities of this Division must of necessity include references to the Federal forestry work conducted by the various relief agencies.

FOREST FIRE CONTROL

The Forest Fire Control work is carried on through coöperation with the United States Department of Agriculture under the Clark-McNary Law which provides that the Government will reimburse the individual state not to exceed 50 per cent of the money expended by that state for forest fire prevention. Through a liberal interpretation of this measure funds contributed by private landowners and by the individual counties may be considered State funds and it is largely through such contributions from counties and landowners that the State's part in the costs is raised. For instance, during the fiscal year 1933-34 the counties reimbursed the State for work actually done in those counties for forest fire control in the amount of \$20,036. Private landowners contributed \$4,300 while the legislative transfer of 10 per cent of the Game Fund to the Forestry Division for this purpose added \$11,000. An additional amount from the appropriation for the Department of \$3,748 and a carry-over of \$500 made a total of \$39,584 which enabled the State to ask and receive from the Federal Government reimbursement amounting to \$38,204. The State's share in this most important activity looks small when compared with that from other coöperators. Beside the large funds being expended by the Federal Government for the maintenance of the CCC camps, which are engaged largely on fire control activities, this total expenditure of \$77,788 looks extremely small.

Personnel. Two factors have contributed very largely to the considerable turnover in the personnel of the Forestry Division, namely, the radical cuts in salaries in compliance with the economy program, and the large demand at much higher salaries for men trained and experienced in technical and practical forestry work.

The following changes in the Fire Control section should be briefly recorded: Charles H. Flory, in charge of Forest Fire Control, resigned April 30, 1934, after eight years faithful and unremitting service, to take up work as forester with the Federal Soil Erosion Service. Mr. Flory was succeeded by W. C. McCormick,

who reported for duty May 15, 1934. Mr. McCormick formerly held this same position, leaving the Department in 1928. W. L. Nothstein, District Forester in District 6, resigned May 21, 1933, to accept a position with the Federal CCC. Charles H. Hearn, Chief Warden in District 6, was transferred to ECW (Superintendent) May 31, 1933, and Fred M. Slagle, Chief Warden in District 1, was transferred to ECW (Superintendent) on July 20, 1933, due to lack of funds for continuing them on the State payroll.

Annie K. Cook Whitford, Clerk in the District 4 office, resigned December 17, 1933. Due to lack of funds no one was appointed to succeed Mrs. Whitford; however, Miss Mary Louise Waters was given part-time employment in this office, being paid from county funds. R. N. Freeman, Clerk in District 5, resigned June 15 to accept a better paying position. Miss Susan Pearce, Clerk in the District 6 office, who was being paid from private protective association funds, was discontinued in the District 6 office, and transferred to full-time duty in District 5 on July 1, to succeed Mr. Freeman.

County Cooperation. Much difficulty was experienced at the beginning of the 1932-33 fiscal year in getting counties to sign up for coöperation in Forest Fire Control, due to reduced county revenue. Columbus, Chowan, Lenoir, Perquimans and Hoke counties discontinued coöperation at the beginning of 1932-33 and all fire control equipment was lifted from these counties. Clay and Richmond counties, which had discontinued coöperation during the previous year, renewed coöperation during the 1932-33 fiscal year. Craven made a small appropriation for a special patrol crew for the spring fire season of 1933. This county renewed full coöperation at the beginning of 1933-34. Yancey and Surry discontinued coöperation at the beginning of 1933-34.

COUNTIES COOPERATING AND ANNUAL SUMS MADE AVAILABLE BY THEM

County	1930-31	1931-32	1932-33	1933-34
Alexander.....	\$ 350	\$.....	\$.....	\$.....
Avery.....	400	500	500	500
Beaufort.....	1,650			
Bertie.....	600	800	680	1,000
Brunswick.....	1,000			
Buncombe.....	1,000	1,150	1,000	1,000
Burke.....	600	1,300	1,300	1,300
Caldwell.....	750	1,000	1,000	1,000
Chatham.....				1,200
Cherokee.....	700			
Chowan.....	300	400	†	
Clay.....	400		400	
Columbus.....	2,000	2,700		
Craven.....	1,200		125*	1,000
Cumberland.....	750	750	600	750
Durham.....		700	700	700
Edgecombe.....	500	550	500	650
Greene.....	450	500	500	500
Halifax.....	600	600	600	600
Harnett.....	600	600	500	500
Haywood.....	400	400	400	400
Henderson.....	350	500	500	400
Hertford.....	500	500	500	600
Hoke.....	400	400	†	400
Jackson.....	500			420
Lee.....	300	300	300	300
Lenoir.....	600	650	†	
Macon.....	600	600	565	500
McDowell.....	700			
Montgomery.....	700	750	750	750
Moore.....	1,200	1,250	1,000	1,000
Northampton.....	500	500	500	500
Pitt.....	850			
Polk.....	300			300
Perquimans.....		600	†	
Richmond.....	750		1,000	1,200
Robeson.....	1,300	1,900		1,628
Rutherford.....	500	1,000	1,000	1,000
Scotland.....	500	600	600	600
Surry.....	400	300	200	
Swain.....	500			
Transylvania.....		600	600	600†
Warren.....	500	700	500	600
Wayne.....	1,000	1,000	800	844
Wilkes.....	500	500	500	500
Wilson.....	500	700	700	700
Yancey.....	300	300	300	†

* For spring season.

† Cooperation withdrawn.

‡ Inactive.

Private Cooperation. The decline of acreage listed by individual and associated landowners for cooperation with the Department which began in 1931-32 has unfortunately continued, due in large part to the effect of the depression. The following table may be compared with a similar table in the previous biennial report of this Department:

FOREST PROTECTIVE ASSOCIATIONS

Name of Association	Assessment Rate	Location County	Number Individuals in Association		Acreage Listed	
			1932-33	1933-34	1932-33	1933-34
Elk Creek Association.....	2¢	Watauga, Wilkes				
		Caldwell.....	1	1	40,000	40,000
South Mountain Association.....	1¢	Burke, McDowell				
		Rutherford.....	3	5	22,000	17,000
Table Rock Association.....	1¢	Burke.....	2		26,000	
Moore Protective Association (Minimum Dues \$5.00).....	2¢	Moore.....	17	27	17,000	17,000
Overhills Protective Association.....	1¢	Harnett, Hoke				
		Cumberland....	3	3	36,000	36,000
Serpell Protective Association.....	2¢	Carteret.....	1	1	6,600	6,600
Camp Manufacturing Company.....	1¢	Bertie.....	1	1	19,952	19,952
Camp Manufacturing Company.....	1¢	Hertford-Gates..	1	1	25,507	25,507
Cooper River Timber Company.....	2¢ +	Pender.....	1	1	10,280	10,280
Orton Protective Association.....	2¢	Brunswick.....	3	10	23,000	35,000
Waccamaw Protective Association.....	3¢ +	Columbus-Bladen	2	4	26,000	30,000
Total.....			35	54	252,339	237,339

The following tabular statement shows progress or the reverse made during the two fiscal years of the biennium compared with the two previous years. While this showing is decidedly discouraging it must be remembered that not only the State Department but county officials and landowners were all trying to make ends meet and unfortunately they did not realize that economizing on a long-time beneficent program like the conservation of our natural resources is liable to have much more serious results than cutting down a mere annual expenditure.

PROGRESS CHART

	June 30, 1931	June 30, 1932	June 30, 1933	June 30, 1934
District Foresters.....	5	4	3	3
Chief Wardens.....	6	6	4	4
County Forest Wardens.....	45	34	30	33
District Forest Wardens.....	1,115	931	803	884
Counties Cooperating.....	43	34	30	33
Private Timberland Owners Cooperating.....	54	40	35	54
Forest Area Under Protection (Acres).....	8,964,440	6,946,244	5,804,343	6,405,975
Appropriations by Counties.....	\$ 28,500	\$ 25,750	\$ 23,150	\$ 17,845
Appropriations by Private Owners.....	4,871	4,214	5,064	4,400
Appropriations by State:				
State Appropriation for FFC.....	9,600	4,740	4,740	2,755
Game Fund.....	42,020	16,500	17,000	11,000
Appropriation by Federal Government.....	56,880	51,609	50,560	36,000

Equipment and Improvements. Of necessity the Department expended little for equipment during the biennium since it was felt that temporary reductions in expenditures could best be made here. Only one tower was purchased from State-budgeted funds, namely, the steel tower on Bear Wallow Mountain in Henderson and Buncombe counties. A road and telephone connection have been made to this tower through the ECW. In addition, the two wooden towers on Biggerstaff and Pinnacle Mountains in Rutherford County have been replaced with steel towers through the same Federal agency.

The list of twenty-seven lookout towers previously erected under the State Fire Control program, found on pages 47 and 48 of the Fourth Biennial Report of this Department, with the changes noted above, still holds good; but to these must be added those purchased and erected during the past fifteen months through the ECW program, listed on another page.

Telephone Lines. All towers should be linked up with a local telephone system if one is in existence or at least with one or more of the forest wardens so that the lookout can notify the nearest warden when fire is detected. There has been very little telephone line construction under the regular State protection set-up, much less than was really needed, a total of only twelve miles having been erected by the State Forest Service as follows: A ground-circuit line $\frac{3}{4}$ miles, to Warden Park's house in the Linville River District; a ground-circuit line $7\frac{3}{4}$ miles long linking up Table Rock with Wardens Beck and Wise and the Morganton line in the Linville River District of Burke County; a ground-circuit line of $2\frac{1}{4}$ miles connecting Locust Mountain and Linville Mountain; and a metallic-circuit line 1.6 miles to County Warden Ramsey's house in Northampton County.

Automobiles. The following cars have been purchased for the use of the field officials in the forest fire control work:

- 2 Ford Pick-ups for District 3, August, 1932
- 1 Chevrolet Pick-up for District 4, September, 1932
- 1 Chevrolet Pick-up for District 5, September, 1932
- 1 Chevrolet Coupe for central office, September, 1932
- 1 Ford Pick-up for District 1, April, 1934

The following fire-fighting tools have been purchased, using the coöperative fund allotted to the work in the various counties where the tools are stationed: 566 fire rakes, 319 pumps, 96 brush hooks, 3 lanterns, 82 buckets, 140 swatters, 3 trailers, 11 backfire torches and 16 axes.

Forest Fire Occurrence and Damage. After a spring season of excessive fire occurrence, the fall of 1932 was notable for the very few fires recorded. There were no fires after December 10. In 1933 the spring fire season began the latter half of February and continued with a large number of fires in the eastern part of the State until nearly the end of June. In the mountains, however, there were only four short hazardous periods. During the fall there were practically no fires in the western districts while the eastern districts suffered severely after the first week in October right on to the end of the year. The spring season of 1934 brought a normal number of fires from January 15 to May 23, in the western districts the worst periods being the end of January and the middle of March. In the eastern districts, however, from the beginning of the year up to the middle of May dry and dangerous periods succeeded each other with destructive frequency and a total of 1,187 fires was recorded in the protected counties of the eastern districts.

The following table gives forest fire statistics for the protected areas compared with those for the previous biennium:

FOREST FIRE STATISTICS FOR PROTECTED AREAS BY FISCAL YEARS

	1930-31	1931-32	1932-33	1933-34
Area Under Protection, Acres.....	8,964,440	6,946,244	5,804,343	6,405,975
Number of Fires by Classes:				
A—Under $\frac{1}{4}$ Acre.....	64	68	40	29
B— $\frac{1}{4}$ to 10 Acres.....	801	892	498	882
C—11 to 100 Acres.....	1,522	1,463	720	1,386
D—101 to 500 Acres.....	496	403	106	371
E—Over 500 Acres.....	78	72	15	78
Total.....	2,961	2,898	1,379	2,746
Causes of Fires:				
Brush Burning.....	386	460	227	371
Hunters, Fishermen, Campers.....	325	519	131	694
Railroads.....	80	74	47	52
Lumbering.....	50	37	16	65
Incendiary.....	680	620	362	427
Smokers.....	591	526	333	652
Lightning.....	28	10	8	10
Miscellaneous.....	299	258	130	234
Unknown.....	522	394	125	241
Total.....	2,961	2,898	1,379	2,746
Area Burned, Acres:				
Merchantable Timber.....	71,812	60,278	14,263	82,170
Reproduction.....	184,773	184,364	47,599	157,132
Open Grass Land.....	29,861	25,299	6,671	19,075
Total.....	286,446	269,941	68,533	258,377
Average Area Per Fire, Acres.....	97	93	50	94
Per Cent Protected of Area Burned.....	3.2%	3.9%	1.2%	4.0%
Damage:				
Merchantable Timber.....	\$ 147,918	\$ 135,249	\$ 32,031	\$ 214,863
Reproduction.....	344,336	361,906	82,607	290,825
Other.....	43,333	37,037	14,836	54,717
Total.....	\$ 535,587	\$ 534,192	\$ 129,474	\$ 560,405
Average Damage Per Fire.....	\$ 181	\$ 184	\$ 94	\$ 204
Total Fire Fighting Costs.....	33,170	30,399	8,479	22,509
Average Fire Fighting Costs Per Fire.....	11.20	10.49	6.15	8.20
Law Enforcement:				
Number of Prosecutions.....	122	101	52	57
Number of Convictions.....	91	83	33	44
Number of Acquittals, etc.....	31	18	19	9
Fines and Costs.....	\$ 1,257	\$ 1,192	\$ 545	\$ 666
Responsible Parties Apprehended:				
Number of Parties Billed.....	296	229	144	184
Number Making Payment.....	255	132	92	89
Amount Received.....	\$ 2,024	\$ 934	\$ 419	\$ 519

FOREST FIRE STATISTICS FOR PROTECTED AREAS BY FISCAL YEARS—Continued

	1930-31	1931-32	1932-33	1933-34
Cost Paid by Landowners:				
Number of Parties Billed.....	14	8	4	-----
Number Making Payment.....	11	8	4	-----
Amount received.....	\$ 136	\$ 79	\$ 15	-----
Warden Activities:				
Number of Hours Worked.....	66,709	66,725	55,724	80,279
Miles Traveled—Car, Foot, Horse.....	156,714	159,084	129,883	195,075
Number of Notices Posted.....	3,476	4,178	2,443	1,126
Number of People Interviewed.....	40,532	39,451	33,190	29,037
Number of Sawmills Inspected.....	370	290	259	287
Number of Schools and Meetings Visited.....	519	588	671	277

Fire in Non-Cooperating Counties. At the urgent request of the United States Forest Service attempts were made at the beginning of each calendar year to collect forest fire statistics in counties which had not been coöperating. Since there had been no forest wardens in those counties no record had been kept of the fires and there were no officials in those counties who had made records or even observed the fires. However, with the help of the county game wardens, the district foresters with the assistance of the central office arranged trips through the counties and by dint of questioning interested citizens and through personal investigation on the ground, fairly accurate reports were secured of the extent and damage done by fire during the previous year. It seems certain that many fires must have been overlooked, so that the results were probably conservative. The following statement contrasts the results of this study compared with the more accurate reports on protected lands:

	Area Protected by State	Area Unprotected	Total
Forest Lands in North Carolina—Acres:			
1932.....	6,411,563	14,156,437	20,568,000
1933.....	6,056,590	14,511,410	20,568,000
Number of Fires Reported:			
1932.....	2,027	1,098	3,125
1933.....	2,100	1,550	3,650
Area Burned—Acres:			
1932.....	183,914	759,471	943,385
1933.....	143,880	2,168,900	2,312,780
Per Cent of Total Forest Area Burned:			
1932.....	2.87%	5.36%	4.59%
1933.....	2.38%	14.95%	11.25%
Damage:			
1932.....	\$ 390,263	\$ 1,813,965	\$ 2,204,228
1933.....	324,592	3,014,884	3,340,305

The above figures do not include 474,409 acres of National Forest land protected by the U. S. Forest Service.

Other Fire Prevention Activities. Periodic meetings for the instruction and advice of county wardens and conferences of the district and central officials relating to policy and plans for improving the efficiency of the work have as usual been held by the Assistant Forester in charge of fire control. The district meetings—usually held at district headquarters—to which both county and district wardens were invited, have been helpful in stimulating interest and unifying efforts. At these meetings reports are received from the county wardens and instruction is given in enforcement, procedure, and policy. They are especially valuable in improving the accuracy and completeness of written reports.

The annual meetings of the district foresters and chief wardens, usually held in Raleigh, are somewhat more formal. They usually follow a carefully prepared program though questions may be asked and answered by any member of the conference. As an example, the program for the conference held in Raleigh October, 1932 included: (1) The rate of pay to fire-fighters and wardens; (2) Establishment of the paid crew idea to supplant pick-up fire-fighters and to reduce the warden personnel; (3) Office methods, accounts, allotments, form revision, etc.; (4) Purchase and maintenance of fire-fighting equipment; (5) Extension of the tower and telephone line system and other improvements; (6) Construction and maintenance of signs; (7) Fire line construction methods, equipment needed and costs; (8) Arrangement of dates for County Warden and District Warden meetings.

The conference fifteen months later invited the superintendents of each of the CCC camps under the supervision of the Department, since the camp work had by that time become one of the most important features in the fire prevention program. The technical foresters in the Department and the forest wardens are called upon from time to time to explain the objects and methods of fire protection to schools, clubs and other groups. It is unfortunate that the technical staff does not have more time for these contacts. It is only by getting the work appreciated and understood by the public that best results can be obtained.

An important feature in the fire prevention program is the careful and moderate use of signs and posters. In August, 1932, there were purchased 200 forest fire warden auto plates, 4 x 14 inches, which were distributed to county forest wardens. In January, 1933, 2,500 copies of three large posters were distributed for posting in the cooperating counties, namely, "Help Prevent Forest Fires," 1,000; "Save the Forest," 500; "Hunters! Forest Fires Kill or Drive Away Game," 1,000.

Forestry exhibits were made each year at the State Fair under the direct charge and supervision of Assistant Forester Flory. In addition a number of county fairs contained exhibits put up by the district foresters, assisted by the chief or county forest wardens. The list of fairs for the fall season of 1932 included Cherokee Indian Fair, Rutherford County Fair, Wilkes County Fair, Robeson County Fair, Moore County Fair, Wayne County Fair, Atlantic District Fair, Edgecombe Exposition, and Armistice Day Parade. All five districts were represented in this list. At a cost in material of less than \$50, exhibits were shown to an aggregate estimated attendance of around 60,000 people. While very few of the thousands who attend these fairs are willing to take the time to examine and think of the meaning of the exhibits, a lesson in forest conservation is no doubt carried across to many of those who see it. The practice of making these exhibits could well be continued and, with some additional appropriation, undoubtedly extended.

In this connection it seems proper to pay tribute to the newspapers of the State which have cooperated with the Department in making possible a large amount of educational publicity. Editorial comment has been almost universally favorable to the forestry work and the space devoted to news relating to fire prevention,

forest management and other conservation features is enormous. It is very evident that the people of North Carolina for whom these newspapers are published are interested in this subject.

PROPOSED PLAN FOR STATE-WIDE FOREST FIRE CONTROL

Past experience with county coöperation in North Carolina has proven conclusively that the only satisfactory method of forest fire control in the State is that this work be made State-wide. Under the present set-up counties may or may not coöperate. Without cause, they may cease coöperation by simply giving the State 30 days notice of their desire to discontinue the work. Even though the county's share of such appropriation, as is deemed necessary for the proper conduct of fire control work in any given county, is sufficient to properly carry on fire control activities there is absolutely no assurance of stability in the organization. Fire towers, telephone lines and other improvements are constructed. Tools and equipment are purchased. A satisfactory organization is appointed and functions perfectly for a year, two years, three years. The County Commissioners then in office are in thorough sympathy with the work, and were they to remain in office the work would become more or less permanent. However, this is not the case. Incoming commissioners unfamiliar with the work, or not in sympathy with it, can immediately undo all of the work that has been done over a period of years and force the abandonment of permanent fire control improvements, break up the warden organization, and lands that have been protected for a period of years are allowed to burn over at a time when they will burn far more severely than had no protection ever been given them.

A plan for State-wide fire control will be prepared. This will cover the entire 100 counties. If this plan can be put into effect fire control can be stabilized—there is no other method.

At present the State is divided into six Forestry Districts. A shortage of funds has forced the reduction of the supervisory personnel to three District Foresters, each in charge of two districts. Each of these District Foresters now has to supervise the work in 15 coöperating counties. It is humanly impossible for any District Forester to give the attention that is required for the proper supervision of fire control organizations, to handle 15 counties, and direct the work of some 500 wardens satisfactorily.

Up to a few years ago there were six District Foresters, one in each of the six districts now functioning, and one Chief Warden as his assistant; and this at a time when fewer counties were coöperating which naturally meant less work.

At present there are 44 counties coöperating with the largest total appropriation ever made available from county funds. Based on the experience of the last fiscal year, when many counties voluntarily signed coöperative agreements, the number of counties willing to coöperate under the present set-up can unquestionably be increased to 60, but this will be impossible unless additional funds are provided for the employment of additional supervisory personnel.

The State-wide fire control plan that has been worked out would divide the State into seven Forestry Districts. The boundary lines of these districts have been arranged with the idea of forming units of counties similar in character where a lookout and telephone line system may be installed, or is now in operation, to provide the maximum of protection for the minimum of costs.

In six of these districts there would be intensive fire control conducted. In the

seventh, which comprises the Piedmont Section and embraces thirteen counties, extensive work will be carried on.

A conservative estimate of the funds necessary for the carrying out of this State-wide plan totals \$239,000. These funds are proposed from the following sources: Federal Government, \$75,000; one hundred counties, \$80,000; private landowners, \$10,000; ten per cent of the State Game and Fish funds, \$15,000; State appropriation for forest fire control work, \$59,000.

It is not fair to the counties that do wish to coöperate with the State in fire control work for an adjoining county not to provide coöperation and then allow fires that must be fought to start in these non-coöperating counties to protect the adjoining coöperating counties. Public sentiment in these coöperating counties is favorable to State-wide fire control in which each county will bear its own share of fire control costs.

A law requiring the State Forester to determine those counties in which fire control is necessary, should be enacted. After a careful survey of the conditions on the ground the State Forester should determine the probable annual cost of forest fire control for that county. The county would then be asked to appropriate one-half that amount, the other half to be met from the State and Federal fire protection fund.

Such a law is not unknown. Several states have had similar statutes in effect for a number of years. These are working to the satisfaction of every one concerned. Such a law would not place any additional burden on the tax payers. Sums ranging from \$500 to \$2,500—according to the amount of funds necessary for the proper conduct of the work in an individual county—would be all that would be necessary. Were such a law in effect, numerous individuals owning timberlands would list their lands with the State for additional protection, which would automatically reduce the county appropriations and give more intensified protection.

This fire control work is protecting a natural resource that has meant more to North Carolina in years gone by than any other and right now is the proper time to put State-wide fire control into effect while forestry is foremost in the minds of many, due to the President's reforestation program.

FOREST PLANTING

State Forest Nursery. With the heavy cut in the forestry budget it was feared at first that the nursery might have to be abandoned, at least temporarily. However, with the assistance of the Emergency Relief Labor operations have been continued on about the same scale as formerly. With the resignation of F. H. Claridge, the responsibility for nursery work devolved largely upon Addie Pace, the local nurseryman. The services of an average of about three men, working about three days a week were obtained through the RFC beginning in November, 1932, and ending August, 1933. Then through the winter of 1933-34 a small amount of labor was secured through the local officials of the CWA, an average of five men some three days per week working in the nursery.

In the fall of 1933, permission was obtained for the establishment of a side camp at the nursery from the CCC camp located at Durham. With the help of these men, the digging and shipping of seedlings, the preparation and sowing of the new seed beds and the protection and weeding of the young seedlings throughout the spring and summer of 1934 has been carried on. A barracks to accommodate the fifteen men has been erected on the nursery, a five-room cottage has been built, and an adequate sewage disposal system has also been installed, all without cost

to the State. The nurseryman, Addie Pace, is now living in the cottage with one room reserved as an office for the use of the superintendent whoever that may be. The total cost of these buildings, including foreman's time and 555 man days for enrollees at \$3 per day was: Barracks (later to be used as seed house), \$927; Cottage, \$2,736. It is hoped that the side camp may be continued through the coming winter, but with the removal of the camp from Durham County this seems problematical.

With the prospective increase in demand for forest seedlings incident to the activities of the different Federal relief organizations the attempt to establish a branch nursery in the mountains for the production of seedlings suitable to that climate was made and sites in several counties were considered. However, no funds have yet become available for this extension of the work.

DISTRIBUTION OF FOREST SEEDLINGS BY SPECIES, 1932-34

	1932-33	1933-34
1. Loblolly Pine.....	93,006	258,392
2. Shortleaf Pine.....	56,381	61,202
3. Longleaf Pine.....	19,790	24,152
4. Slash Pine.....	11,331	31,152
5. Black Locust.....	25,400	34,652
6. Tulip Poplar.....	22,700	4,621
7. Black Walnut.....	8,846	9,445
8. Red Gum.....	2,450	6,952
9. Miscellaneous.....	2,578	5,040
	242,482	435,608*

* About 50 per cent of these were planted on public land.

Through the courtesy of the Log Cabin Association of Sylva, Jackson County, which is growing forest tree seedlings for distribution to the people of Jackson and surrounding counties, the Department was supplied with some 15,000 locust seedlings which were planted on erosion control areas by the CCC camp in Stokes County. An arrangement has now been entered into between the State Forester and Arthur Weidelich, manager of the Log Cabin Association, whereby such available seedlings as they have to spare will be distributed at the request of this Department. This arrangement makes available white pine, Norway spruce, and one or two other mountain species which otherwise could not be obtained.

In October, 1932, the city of High Point requested the coöperation of the Forestry Division in the planting of eroding open fields around the large reservoir on Deep River. Some 64,000 seedlings were furnished from the State Forest Nursery, including 25,000 shortleaf pine, 22,000 loblolly pine and 15,000 locust. Twenty-four thousand loblolly pines, obtained from the Maryland State Forest Nursery, were also planted. Mr. Claridge spent a couple of days on the watershed the latter part of November, starting the planting and instructing the city employees in the details of the work. An extension of this program in coöperation with the Soil Erosion Service is now contemplated.

Owing to the depression, the demand for seedlings for farm planting declined during the biennium. This was no doubt also due to the prevailing idea that the Federal Government was paying for all general improvement work. Fortunately,

with the aid of the CCC camp at Durham, all seedlings with the exception of a few black walnuts were planted, nearly half of them going on public land, namely the Hill Forest in Durham County and the University Forest near Chapel Hill. The Duke Forest at Durham continued coöperation in the demonstration program by planting between 90,000 and 100,000 seedlings each year.

DISTRIBUTION OF FOREST SEEDLINGS BY CLASS OF COOPERATORS, 1926-1934

Class of Cooperators	Biennium 1932-34		Total Period 1926-34	
	Number Cooperators	Number Trees	Number Cooperators	Number Trees
Farmers.....	98	95,322	427	961,244
Individuals and Companies.....	9	55,930	33	187,087
Schools.....	31	202,913	229	410,221
State Institutions.....	20	224,672	42	315,106
Boy Scouts.....	4	4,075	30	14,680
4-H Clubs and Home and County Demonstration Agents.....	519	12,975	2,360	61,071
Municipalities.....	2	84,674	2	84,674
Total.....	683*	680,561	3,123*	2,034,083

* Many duplications in these.

Cooperation with the Soil Erosion Service. Following the selection of two areas in Piedmont North Carolina by the Soil Erosion Service for improved farm management, an arrangement was entered into with the Service to produce at the State Forest Nursery not to exceed 2,000,000 seedlings of pine and locust for planting up eroded and abandoned areas. The water system was extended and a seed supply ordered. Unfortunately owing to the lateness of the season—the middle of April—and the failure to find necessary seed of shortleaf pine, the supply of seedlings available for the Soil Erosion Service next winter will be far below their requirements. The material for the water system and the seed beds as well as necessary seed and fertilizer has been paid for by the Soil Erosion Service, that agency to be reimbursed from the seedlings to be delivered to them. Plans are under way for a still further increase in seedling production since the estimates of the needs of the Soil Erosion Service, which include planting up much more of the High Point watershed, contemplate the use of many million seedlings during the next three or four years and they will be, in large part, dependent on the State nursery to furnish this material.

Highway Planting. Early in the Relief Program plans were made for planting and otherwise improving and beautifying the roadsides of the State. A landscape architect was employed by the State Highway Commission to assist local agencies in this work which was mostly connected with the relief employment of men in the cities and towns. The State Forest Nursery, however, received few calls for material for planting along these highways. As a result some fine young oak trees grown in the nursery which could not be used had to be destroyed the past spring to make room for seedling beds.

Asiatic Chestnuts. In order to make room for forest seedling production it became necessary to utilize all possible available space on the small nursery area. Arrangements were therefore made to dig and ship all the remaining Asiatic Chestnuts which the United States Bureau of Plant Industry had supplied for experimental distribution during the past several years. Some 2,800 trees, varying in size from one up to ten feet in height, were dug, packed and shipped at Federal expense in March, 1934. There were a number of different varieties or strains of these chestnuts, some of which were proved of no value for this climate and others showed considerable promise. From the supply furnished young chestnut trees have been distributed to a number of North Carolina counties, but no outstanding successes have been reported. Some of the varieties showed a tendency to bloom and ripen seed at a very early age but most of them seemed to be more or less susceptible to disease. The Federal Government plans to continue this experiment with these trees under the Tennessee Valley Authority auspices in the neighborhood of Clinton, Tennessee.

Insect Pests. The controlling of insect and fungus diseases seems to be one of the chief problems of the nurseryman. Control methods for the white grub suggested by the Bureau of Entomology have been continued and proved fairly effective through the summer of 1933. However, that Bureau undertook extended experiments for the control of this pest during the spring and summer of 1934, and H. R. Johnson, under the general supervision of the State College, has been dividing his time between the nurseries of this State and South Carolina. At present this pest seems very far from eradication.

Early in June the wilt disease broke out in the black locust seedling beds almost immediately after the seedlings came into second leaf. An appeal to Washington brought Dr. E. B. Lambert of the office of Forest Pathology and with his advice spraying practice seemed to help the situation considerably. However, an alarming percentage of the locust seedlings succumbed to this disease, which Dr. Lambert states is due to two or more different fungi. It is thought that somewhat later sowing of locust and much earlier sowing of pine than was possible in the past spring will result more satisfactorily.

STATE PARKS, LAKES AND FORESTS

Fort Macon State Park. This park of 400 acres or more on the extreme eastern end of Bogue Bank in Carteret County was deeded to the State by the War Department in compliance with an act of Congress in 1924. It is eminently a recreational and historic park.

For two or three months during the summers of 1932 and 1933 a warden, Wilbur Lewis, was maintained on duty at the old fort three or four days per week. On August 3, 1932, while the warden was on duty within the fort, a party of young people thoughtlessly but probably accidentally set fire to the grass on the ramparts and in spite of the work of the warden, aided by Coast Guardsmen, the fire got beyond control and destroyed practically all plant growth east of the station. The experimental plantations of pines and other trees, some of them several years old, were all wiped out. The inner courtyard and the camp cottage were all that escaped.

The lease on the camp cottage formerly held by the late George A. Nicoll expired on July 1, 1933. A request for renewal on the part of his executor was denied on the advice of the Attorney General and the keys were turned over to the Depart-

ment July 14. Two other requests for the lease of camp sites were also denied because the deed to the State for this former military reservation provides that the land "shall be limited to use for public purposes by the State of North Carolina and upon cessation of such use the estate hereby quit-claimed shall revert to and revest in the United States without notice, demand or action brought."

Following the destruction of the old Atlantic Hotel at Morehead City by fire in April, 1933, the State Forester suggested that the hotel site and frontage, property of the State, be converted into a State park, with landing docks for small pleasure craft, comfort stations, etc., for the benefit of the many visitors who flock to the seacoast in summer, as well as the local people. This area and Fort Macon could be administered as one park and during the summer they might well be connected by a line of small passenger boats. Legal and other difficulties have so far prevented the consideration of this suggestion.

With the setting up of the Emergency Conservation Work in the spring of 1933, applications were made to both the United States Forest Service and the National Park Service for Federal CCC Camps for the construction of an approach road, restoration of the 100-year-old fort and control of the drifting sand, but for different reasons these applications were denied.

In November, application was made for allotment of CWA labor. This was granted and with the assistance of National Park Inspector L. A. Sharpe a road along the sound was laid off. H. L. Oxley, former engineer in the Water Resources Division, of this Department, was put in charge of the work. With from 60 to 100 men he did excellent work on the road and also started sand control measures. Some 5,000 live oak seedlings secured from Louisiana through the CWA were planted experimentally but without much success.

With the donation to the State by the owners of a strip of land some 2.2 miles long and 100 feet wide for the road between Atlantic Beach and the State Park boundary, one of the chief difficulties in securing a CCC camp through the National Park Service was removed, since all the proposed work would be done on publicly owned land. Deeds in fee simple have already been executed from the Atlantic Beach and Bridge Company for 11.19 acres, from Guy M. Arthur and wife for 3.32 acres, and from McClamroch and Carr for 3.93 acres. A deed from V. Asbury and wife for 3.77 acres has been promised, but is not yet complete.

The first detachment of 50 CCC men went to the fort on April 19, 1934, and the remainder some two or three weeks later; and, on recommendation of this Department, Frank P. Shore was appointed superintendent. Under his supervision the grading of the road has progressed rapidly. Plans for restoration and protection of the fort are being made and sand control measures have been continued. In the remaining nine months of the camp a large program for park improvement will, it is hoped, be carried out.

Mount Mitchell State Park. This, North Carolina's first State Park, was acquired through special appropriation by the General Assembly of 1915. It consists of 1,224 acres, including Mount Mitchell, 200 acres of which is covered with virgin spruce and balsam forest and the remainder is cut-over forest land. It is bordered on the east by the Pisgah National Forest and on the west by private land leased as a hunting preserve. The park, administered from the beginning as a wild life sanctuary has now been included, for purposes of administration, in the State Game Refuge established on the adjoining national forest. The chief result of this is that the park warden assists in the protection of the Game Refuge and the game wardens help to protect the park. The need of a sanctuary in this region can be

understood from the fact that some forty to fifty bears are killed on and near the adjoining hunting preserve each fall. The warden, Ed Wilson, has remained on the park to look after visitors and to protect the property for the past several years, except for a six week's period in December and January when little or nothing can be done. During this period, however, he has visited the park every three days to keep up the weather records. It is interesting to note that recorded maximum and minimum temperatures on the summit of Mount Mitchell were as follows: In 1932, highest, 74° on August 28; lowest—11° on March 10; in 1933, highest, 78° on June 21 and other dates; lowest—17° on February 9. These extremes range from 13° to 23° below the recorded extremes for Asheville. Two private toll roads bring visitors to the park but attendance has fallen off very seriously the last two or three years. This is indicated in the decline in revenue from the refreshment stand concession which pays 10 per cent of its gross receipts for this privilege. Revenue from this source was approximately as follows: For 1931, \$60; for 1932, \$40; and for 1933, \$20.

The fact that the park could only be approached by vehicles over private toll roads has so far prevented the establishment of a CCC camp upon it. Such a camp was applied for first from the United States Forest Service and then from the National Park Service for the construction of fire lines, trails, and camping facilities, but without success.

The planting of the cut-over areas has had to be suspended for lack of funds but it is hoped that the native balsam seedlings already three years in the seed beds may be put out next spring. It is hoped before long that the State Highway System may be extended to this public property, thus making it accessible without undue cost.

Rendezvous Mountain State Park. Some seven years ago the General Assembly authorized the State Highway Commission to construct a road to Rendezvous Mountain State Park, but since there were no funds available for this purpose nothing was done. With the establishment in July, 1933, of a CCC camp in Wilkes County only a few miles from Rendezvous Mountain it became possible to construct this road with ECW funds and men. With the advice and substantial coöperation of the State Highway Commission which furnished some necessary heavy equipment, work was begun in August on an eighteen-foot road which is now complete. This road runs for a considerable distance over private land before entering the State Park. It then winds through the park to the top of the ridge where a parking place has been provided. Since the only available space suitable for parking was outside the park property two acres have been acquired for this purpose, the necessary costs being paid from the sale of dead chestnut cordwood cut and marketed by the CCC camp. The total length of the road as constructed is 10,765 feet. Only 3,840 feet of this, however, are on public land the remaining 6,925 feet being the approach over private land. It has an average width of sixteen feet. Two miles of foot trails were also constructed on the park. A total of 7,587 man days of the enrolled men was used on this project.

In accordance with the provisions of the gift of this property by Judge T. B. Finley to the State, the Daughters of the American Revolution took up with this Department the question of erecting a tablet on the park and two tablets on the highway indicating the approach to the park. This was done with the full approval of this Department. It is now planned to erect a lookout tower on the highest peak of this park to form an integral part of the State's forest fire detection system. A

small cabin or camp will also be erected for the accommodation of the lookout man during the fire seasons and for temporary shelter for visitors.

State Lakes. The administration of Waccamaw and White Lakes has been handicapped by lack of funds for employing wardens, by the fact that no land surrounding any of the State lakes was in State ownership, and by the difficulty of securing sufficient evidence to convict parties of infraction of the regulations. Public regulations covering the recreational use of these lakes by bathers, boaters and fishermen were approved by the Board of Conservation and Development in July, 1932. However, an attempt to enforce the recently enacted law against exceeding a speed limit of fourteen miles per hour for motor boats on White Lake was not successful because no way was found to determine accurately the speed of boats on the lake. The decision to restrict and gradually to eliminate all closed buildings over the waters of the lake has been continued and two or three boat houses have been removed from White Lake. An application to repair and lease the Waggaman Pavilion on Waccamaw Lake was denied for this same reason. It is hoped that this source of pollution and trouble can be removed from the lake shortly.

The practice of issuing permits for trot-line fishing to local residents was continued, but only fourteen permits were applied for in the winter of 1932-33. Owing to the enforced absence of the warden the succeeding winter, no permits were issued. The successful prosecution of a case for selling fish taken in Waccamaw Lake may have had some effect in discouraging trot-line fishing. The practice of requiring permits and furnishing license plates for the operation of boats upon these two lakes has been continued; and while this brings in only a small revenue, scarcely sufficient to cover actual cost, it has proved to be a very material factor in the control of this recreational feature. It seems very difficult for the public at large to realize that State property cannot be used to the private advantage of the individual and occasionally someone erects a structure on one or other of these lakes without application for a permit. However, on the whole the public has taken the matter of charging for the privilege in excellent spirit, and with full-time wardens the growing use of these lakes for recreation will no doubt be handled with mutual satisfaction.

Due to deficiency of rainfall and consequent low water during the past few years White and Waccamaw Lakes have maintained minimum water levels for a considerable period. Applications for extension of docks have been granted in order to allow for access to deep water for parties operating public docks, but one or more applications for the extension of private docks have been refused, since the low water was only a temporary condition.

The President's national recovery program has not yet affected conditions at the State lakes. A CCC camp was located on the shores of Waccamaw Lake and a permit was issued for the construction of a dock from this camp. A request was also made to construct a retaining wall along the north shore of the lake under the CWA, but this could not be granted because the estimated cost of necessary material was out of proportion to the labor item. A community center for Columbus County in the town of Lake Waccamaw was proposed and the necessary land offered as a gift by two of the local citizens, but before the plans could be approved by the PWA and work begun the opportunity for this passed.

Wardens were on duty at these the only two State lakes so far put under administration as follows: Summer, 1932, W. R. Whitted, County Warden, had charge of White Lake; and P. G. Sutton, of Waccamaw Lake. In 1933, Robert Hubbard of Clinton was warden of White Lake for the three summer months. Since he was

resident at the lake he was able to accomplish more than had previously been done. Through lack of funds no warden was employed on Waccamaw Lake, but the county warden gave some general supervision. No license fees were required. For the summer of 1934 a coöperative arrangement has been made whereby the county fish and game wardens in Bladen and Columbus counties, namely, M. H. McQueen and George W. Frink, have given half their time to the supervision of White and Waccamaw Lakes respectively. Owing to lack of boats, the enforcement of regulations has been extremely difficult and in many cases impossible, while the collection of permit and fishing fees has been reduced. An attempt will be made to repair the worn-out outboard motor previously used by the wardens at Waccamaw Lake.

No attempt has been made to administer the other State lakes, namely, Singletary, Jones, Salters, and Black Lakes in Bladen County, and Phelps Lake in Washington and Tyrrell counties. With the increasing demand and opportunity for recreation and the gradual closing up of private hunting and fishing waters, these other lakes should be put under administration and the fishing protected and regulated for the benefit of the public.

PUBLIC FOREST PROGRAM

State Forest Acquisition. The General Assembly of 1929 enacted a law, Chapter 282, establishing a policy for the acquisition of land for the establishment of State forests and parks. This measure was "To Provide for a Special Study of the Forest, Cut-over, Open and Shore Lands of North Carolina With the Object of Recommending to the Next Regular Session of the General Assembly a Public Policy Looking to the Selection and Ultimate Acquisition of Areas Which Should be State Owned or Controlled for the Production of Timber and the Permanent Use and Benefit of the Public."

Section I reads as follows: "That the General Assembly of North Carolina do hereby formulate and endorse the following policy and program relating to the forest, cut-over, open, shore and marsh lands of the State both privately and publicly owned:

(a) That such lands, as soon as possible, be brought up to and maintained at their highest productive use, for timber or other forest products, for recreation, education, stream protection or other public benefits;

(b) That the State should plan to retain, or acquire by gift or purchase, certain lands which might be classed as follows:

1. Forested or cut-over land with young growth and some possibilities of production, suitable for State forests, for timber production, for demonstration in forestry methods, and for experiments in forest management. Such areas to be located in the different counties and containing the varied conditions of soil, drainage, climate, cover types and topography necessary for such public uses.

2. Lands suitably located and specially adapted for use as game refuges, public hunting grounds, and other uses contemplated in the game and inland fisheries laws.

3. Lands surrounding the State lakes which are or may become necessary for the proper administration of said lakes for the future protection of the public's interest.

4. Shore or marsh lands bordering the ocean, sounds or rivers specially suitable for wild life refuges, public hunting grounds, camping or other public uses.

5. Specially scenic areas containing waterfalls, high mountain peaks, unique forest or other growth, or other areas of outstanding interest or beauty of primary public value.

6. Lands containing unique historic or sentimental value, Indian mounds or early settlements."

In Section II, the State through its Department of Conservation and Development is directed to make a study of such lands with the "object of determining their location, condition, ownership and present value," in order to report to the Governor and the General Assembly. While this law only expressed again the long-time policy of the Department, it has placed on record one of the most important features of the State's Forestry Program and one which at last seems possible of accomplishment. While no appropriation was made available to carry out this law, opportunities of making studies of individual areas have from time to time presented themselves and, so far as funds would permit, these have been looked into and reported as directed.

In September, 1933, the southern part of Smith Island at the mouth of the Cape Fear River was offered to the Department for a recreational and demonstration area. There were said to be some 5,000 acres in this tract which could be secured through the payment of back taxes. This property contains the only natural stand of palmetto trees in the State, it being the extreme northern extension of this southern tree. The area would make a wonderful sanctuary for sea birds and might at some time in the future with greater accessibility be developed into a desirable public recreation ground. An attempt was made to secure private donations to meet the costs of acquisition, but without success.

In November, 1932, the Camp Manufacturing Company of Franklin, Virginia, offered to the Department a number of tracts of cut-over land in Duplin and Sampson counties aggregating some 1,300 acres. After examination of the land and careful inquiry as to the condition of the gift, the Department decided on the advice of the Attorney General that the gift could not be accepted.

The possibility of transferring to public ownership certain areas on the banks of Dare County for the purposes of conducting experiments and carrying forward improvement works for the fixation of the sand dunes and the protection of the highway justified the investigation of these lands by members of the Department. The lack of funds even for the establishment of a small forest nursery to supply planting stock has prevented any progress on this project which now seems on the way to partial fruition through the establishment of a CCC camp. However, since acquisition of land is not now proposed the public interest may become secondary to private benefit. The establishment of a public park on the banks for public salt water bathing, boating and fishing will be one of the great needs of the future.

Proposed Federal Aid in Acquisition. Following a conference in Washington early in February, at which the Chief Forester, F. A. Silcox, urged Federal Aid in the acquisition of State forests, a letter was sent out to all state foresters asking that a State forest acquisition program be submitted for each state. On March 1, a map and memorandum were submitted presenting a preliminary plan for the acquisition of nine State forests scattered throughout North Carolina. The gross area of these suggested public forests was around 900,000 acres. These nine areas were designated as follows:

Cedar Mountain	55,000 acres	Rockfish	80,000 acres
South Mountains	135,000 "	Bladen	80,000 "
Mount Tirzah	90,000 "	Fort Fisher	30,000 "
Drowning Creek	130,000 "	Phelps Lake	220,000 "
Bentonville	90,000 "		

In April, it was suggested by Forest Service officials that the Surplus Relief Corporation then being organized in Washington might include in its program of Public Parks and Forests the establishment of State forests. This corporation, under the general direction of Secretary Ickes, Secretary Wallace, Harry Hopkins and W. I. Myers, has now set up a Land Use Planning Division with a number of regional directors.

In June, Circular No. 1 of the Submarginal Land Program outlining plans and methods was sent out. Because of its importance in inaugurating a State Forestry program for North Carolina, the following features of the plan are quoted from the Chief Forester's letter of June 15 to the State Forester:

"It is suggested that you contact the Regional Representative of the SRC in your district, to consider with him the possibilities of acquiring forest land of a submarginal status. As you know already, that in taking over lands of this character, the Corporation will buy the land, and in the policy of the SRC, it is understood informally that long-time lease agreements may be made whereby the State can take over the protection and administration of approved areas other than those within national forests or purchase units.

"It is also understood that in the consideration of projects in a respective locality a committee will be formed, headed by the Regional Representative of the SRC; the State Forester; the Regional Forester of the Forest Service; and a representative of the local public. The local committee will meet from time to time to investigate contemplated projects. After the field work has been completed, I understand that it will devolve upon the Regional Representative of the SRC to write up the project and submit his findings for consideration and action of the Corporation."

The Agricultural Adjustment Act proposes to retire through purchase typical areas of submarginal farm land in each of the states and to assist the farm owners and tenants upon such areas to establish homes on more productive soil. The lands to be acquired are to be turned over for long-time administration to such public agencies as can best handle them for the highest interest of the public. Some of these areas will no doubt be suitable for State forests, others for State parks, and while the ownership of the areas will probably remain in the Federal Government, to all intents and purposes those turned over to the states for administration will be state forests or state parks as the case may be. Districts comprising several states each have been set up and district managers and personnel appointed. Dr. Carl C. Taylor of Raleigh, formerly Professor of Agricultural Economics at State College, is Regional Director for North Carolina, Virginia, West Virginia, Kentucky and Tennessee. A State director and field personnel have been appointed and an advisory committee headed by the Director of the State Agricultural Experiment Station has been asked to pass upon suggested areas for acquisition. It is hoped that a program not entirely dependent on Federal relief funds may in this way be inaugurated later to be carried to its proper conclusion by the State itself.

National Forests. The present policy of acquiring land by purchase for national forests in the East was inaugurated at the very beginning of this century, two far-seeing North Carolinians, Dr. Joseph A. Holmes of Chapel Hill, former State Geologist, and Dr. C. P. Ambler of Asheville, taking a leading part in the move-

ment. Through their efforts the Southern Appalachian Region was included with New England in a bill introduced in Congress in 1901 to authorize such purchase. After ten years of constant and persistent effort the Weeks Law was enacted in 1911 and one of the first purchases under this law was an area of some 80,000 acres of the George Vanderbilt Estate now included in the Pisgah National Forest.

While appropriations have been made each year by Congress to continue this program the funds made available have been very inadequate to the task. However, national forests have now been established in nearly all the eastern states. It is only within the last year or two that the National Forest Reservation Commission has authorized the establishment of purchase areas in the Appalachian states outside of the mountain areas. The areas of the three national forests heretofore established in the western part of North Carolina as of June 30, 1934, were as follows:

Pisgah National Forest, 296,041 acres. This includes the Mount Mitchell, Boone, French Broad and Pisgah areas.

Nantahala National Forest, 166,798 acres. This includes 11,369 acres in Graham and Clay counties which had formerly been carried as United States Treasury lands. The southern half of this national forest lies in Georgia and South Carolina. The present area outside the State is nearly equal to that within this State.

Cherokee National Forest, 11,570 acres. This national forest lies chiefly in Tennessee and Georgia, but laps over to a very limited extent into Cherokee County, North Carolina.

With the allotment of reconstruction funds to the Forest Service for the acquisition of lands for national forests during the past fifteen months a most encouraging stimulus has been given to the acquisition program. The purchase areas in the mountains, namely, the delimited areas in which purchases were authorized, have recently been largely extended and we can look forward to the public acquisition of considerable areas of forest land in nearly all the counties lying within the Tennessee Valley drainage basin.

In 1929, the General Assembly amended the act authorizing the Federal Government to acquire lands in North Carolina for national forest purposes so that land might be acquired in any part of the State instead of being restricted to the mountain region. A preliminary examination made about that time by Forest Service officials at the request of this Department resulted in a decision that lands in eastern North Carolina suitable for national forest purposes were held at too high a price. Nothing further was done until the summer of 1933 when the Coastal Plain Region was given careful examination with a favorable report on an area in Jones, Craven and Carteret counties, which, on March 26, 1934, was approved as the Croatan Purchase Area. Since that time examination of the lands included in this area have been going forward and it is expected that administration for this area will soon be set up. Other areas in the Coastal Plain have been examined and with additional appropriations by Congress it is hoped that one or two more purchase areas in that region may soon be approved.

In January, 1934, the United States Forest Service, following the recommendations of this Department, examined several areas in Piedmont North Carolina where the proportion of agricultural land was small. This resulted in the approval of the Uharie Purchase Area in Randolph, Montgomery, Moore and Davidson counties including the Uharie Mountains and the Sauratown Area in Stokes County. These two areas if acquired will for the present be administered as part of the Pisgah National Forest. With the purchase of these two national forests, needed

recreational areas will be established easily accessible to a majority of our industrial centers.

Great Smoky Mountains National Park. Although the Department of Conservation and Development has had no active share in the establishment of the Great Smoky Mountains National Park, it seems proper to include a reference to this large and important development in connection with the public land program and policy of this State.

"Early in 1924 the Secretary of the Interior appointed five men who were nationally known as experts in parks and other outdoor matters to serve as a committee to visit and study the scenic areas proposed for inclusion in the national park system. These gentlemen spent eight months investigating the southern mountain region."

In August, 1924, the General Assembly of North Carolina in special session provided for the appointment of a special commission of eleven men, three from the Senate, five from the House, together with the Speaker of the House, the President of the State University, and the President of State College to present the claims of North Carolina to the Commission mentioned above.

One of the first proposals was that Linville Gorge and Grandfather Mountain be included in a national park. This was considered by the Commission and was turned down because the available area was considered too small. In December, 1924, the committee reported to the Secretary of the Interior that it had thoroughly covered the ground. "We have found," they said, "many areas which could well be chosen, but the committee was charged with the responsibility of selecting the best, all things considered. Of these possible sites the Great Smoky Mountains easily stands first, because of the height of the mountains, depth of valleys, ruggedness of the area, and the unexampled variety of trees, shrubs and plants."

The General Assembly of 1927 incorporated its already existing Commission with Mark Squires as chairman, into the North Carolina Park Commission, authorized the issuance of \$2,000,000 in bonds to assist in the purchase of land in the approved area, using for this purpose subscribed money, the State appropriation, and such other funds as might be secured. Very fortunately the Rockefeller Foundation became interested and contributed more than \$5,000,000 towards the accomplishment of this purpose.

The Federal Government at first decided that it would be necessary to acquire 214,000 acres on the North Carolina side of the park area before the park could be thoroughly established. This condition was later changed so that now 228,960 acres must be acquired by North Carolina and turned over to the Department of the Interior. It is stated by the Park Commission that this required acreage comprises 357 different and distinct tracts of land lying entirely within Swain and Haywood counties. The Tennessee part of the park lies on the opposite side of the Great Smoky Mountains Divide in Blount, Sevier and Cocke counties. The total park area is to be 427,000 acres. Taking the North Carolina area as a whole, it is said that approximately 21,000 acres are covered with virgin spruce forest consisting of a mixture of red spruce and southern balsam timber.

The General Assembly of 1933 made some material changes in the Park Commission law which provides for the acquisition of the needed land and its transfer to the Federal Government, and W. W. Neal of Marion was appointed chairman. The officials in charge of the park at the present time are J. Ross Eakin, Gatlinburg, Tennessee, Superintendent of the whole park; John T. Needham, Bryson City, North Carolina, Chief Ranger for the North Carolina Division; and Arno B. Cam-

merer, Director National Park Service. This Service is a bureau in the Department of the Interior of which Harold L. Ickes is Secretary.

GENERAL FORESTRY

Such routine and miscellaneous activities as are incident to the administration of the forestry work of the Department and in addition a large number of special projects not included under the captions previously described are grouped under General Forestry. Such duties as replying to inquiries covering the whole field of forestry and lumbering and the physical and economic condition of North Carolina are answered day by day. Interviews with interested citizens, the preparation and distribution of circular and educational material, and continual conferences with other members of the Department and officials of related departments, both State and Federal, consume a large part of the effort and attention of the small office force. The reduction in the personnel has increased the duties as well as reduced the output of work from this office.

In addition to the changes in personnel recorded under Forest Fire Control, the following other changes are to be noted: In April, 1933, F. H. Claridge, Assistant Forester in charge of forest planting, resigned to accept the position of Forester-Technician, Federal representative of the United States Forest Service in charge of the work of the CCC camps. A month later Mrs. Elsie Hobby Eason resigned to accept the position of stenographer in the ECW office. At the same time Bryan W. Sipe and Mrs. Elsie Dunn resigned positions in other divisions of the Department to take up work in the ECW office in Raleigh. On August 31, 1933, Col. J. W. Harrelson, Director of the Department, retired to take up again his work at State College, and Director R. Bruce Etheridge took over his duties on September 1. On April 30, 1934, Miss Annie Ramsey gave up her work with the Forestry Division to become principal clerk of the Procurement Office, National Park Service, ECW, established in coöperation with this Department and Miss Susan Marshall completed the fiscal year on part-time in her place taking up regular work as stenographer in the State Forester's office on July 1.

Education. Owing to the greatly reduced appropriation and the substantial increase of work connected with the Federal Rehabilitation Program with reduced personnel the educational work has suffered. No printing has been possible and the preparation of mimeographed material for distribution to schools has been curtailed. In spite of a continuous and increasing demand for "Common Forest Trees" the distribution of this handbook has necessarily been confined almost entirely to teachers who will pay for it. It is now practically out of print and a new edition is one of the chief needs of the forestry work.

The Department has received as a gift the large collection of photographic plates made over a period of nearly twenty years by the late F. H. Bicknell of Linville Falls, North Carolina. These photographs are chiefly of the Linville Gorge region and show to perfection what is probably the most scenic area in the Southern Appalachian Mountains.

During August, 1932, lectures were given at a number of the recreation camps in the mountains. Talks were also made by the several foresters of this Division whenever opportunity offered.

One or other members of the staff have represented the Department at important meetings within the State and close contact has been maintained with the various organizations interested in the same or similar lines of work such as the Garden

Clubs, Luncheon Clubs, and the Social Service Conference. The State Forester is a member of the Southern Appalachian Research Council, the North Carolina Forestry Association, the Society of American Foresters and other organizations whose main objective is the conservation of natural resources.

Woodland Examinations. With restricted travel money the examination of private woodlands with the object of advising the owner as to the methods of forest management has only been made in exceptional cases, chiefly where such examination could be combined with other work in the neighborhood. However, at the request of the Waccamaw Lumber Company, Bolton, a brief examination was made of their property of 110,000 acres in Columbus and Brunswick counties. In the fall of 1932 this company proposed to adopt protective and management measures under the supervision of this Department in conformity with requirements of the PWA through which a loan was anticipated. A plan was drawn up by the State Forester in conference with representatives of the company which was mutually satisfactory. However, the requested Federal aid was not received and the agreement was not put into effect. Such supervision of a private timber tract by the State for the benefit of the landowner might have been a most interesting and instructive experiment.

Copeland Report. In the summer and fall of 1932 the United States Forest Service was requested by Congressional Resolution to make a survey of forest conditions of the country with the object of having definite information on which to base new national forestry legislation. The Appalachian Forest Experiment Station located at Asheville sought the coöperation of this Department and considerable time and effort were expended in securing and compiling estimates of forest conditions in the various counties. This information, along with similar material from the other states, was worked up by the Forest Service into what is known as the Copeland Report, more correctly designated as a National Plan for American Forestry, Senate Document No. 12. This was distributed in May, 1933. It has formed the basis of much of the Federal forestry activity undertaken since then.

Legislation. The General Assembly of 1933 was chiefly engaged in the difficult problem of reducing expenditures to a point where they would meet the expected revenue. There was little constructive or permanent legislation affecting the forestry work. This Department, along with all other State agencies, suffered in greatly reduced appropriations. The approved annual items for forestry for the biennium 1933-35 were in rounded figures:

For Forest Fire Protection, not including an estimated \$11,000 from the Game Fund.....	\$ 2,750
For Forest Planting and the maintenance of the State Forest Nursery..	600
For administration of the State Parks and Lakes.....	1,200
For Administration and Education.....	3,100
<hr/> A total of.....	<hr/> \$ 7,650

This is only about 12 per cent of the appropriations for the year 1929-30.

A joint resolution was adopted early in the session petitioning the President of the United States to authorize the employment of funds and labor designated in the Reforestation Act for use on private lands for the public benefit in North Carolina. An act "to preserve the recreational advantages of the State Lakes" confers authority upon the Department of Conservation and Development to administer

these lakes. Although this authority was probably already centered in the Department, the act makes definite and clarifies certain points.

Lumber Code. Following the enactment of the NRA which required the various industries to propose and operate under codes of fair competition, the lumber and timber products industries was one of the first groups to formulate and present such a code. Due to the wide range of the industry and the various conditions under which it operated the difficulties to be overcome were probably greater than in many of the other industries. However, foresters and lumbermen worked together in producing a code of fair competition which went into effect June 1, 1934. Conferences of Federal and State foresters were held on rules of practice and after preliminary adoption amendments to the code were proposed and accepted. Article 10 of this code deals with the management of privately owned timberlands in relation to the lumber and timber products industries and this article is of great importance to all timberland owners as well as to timber operators in North Carolina. While this Department is not as yet directly concerned with the provisions of Article 10 it recognizes in the Lumber Code authority a co-worker in the protection and improvement of the forest resources of the State. In accordance with the NRA law the Lumber Code authority, which is set up by the industry itself, is responsible for the carrying out of the provisions of the code. At the present time this is being done through the principal lumber organizations. The pine region of this State is placed in the hands of the Southern Pine Association while operations in the hardwood region are regulated by the Hardwood Manufacturers Institute, Inc.

The United States Forest Service explains that "Article 10 of the Code sets up partial cutting or selective logging as the general standard for local forest practice measures under all conditions in which such type of operations is practicable. It also instructs the local Code agencies to study the degree to which trees of the smaller but merchantable sizes may wisely be left as part of the growing stock of the forest and to establish rules for cutting in line with the findings. Planting is recommended where natural reproduction from trees left on the area proves inadequate to restock the land, or where clear cutting of the merchantable stand is permitted.

Strong safeguards against fire are thrown about the forests. The individual operator is to be responsible for fire protection during logging. He must dispose of slash, enforce rules concerning smoking in the woods, provide spark arresters on locomotives and logging engines, suspend operations in dangerously dry weather and have his crews and equipment on immediate call for firefighting."

"These measures provided for in the Lumber Code are designed, according to the Forest Service, to keep the privately owned forest land of the United States in continuous production of timber and thus permit the relogging of each area as the growing trees reach a marketable size. In other words, it is explained, timber lands are to be handled on the same broad basis as farm lands, with the growing timber constituting a succession of crops to be protected, tended, and harvested as a continuing resource."

EMERGENCY RELIEF ACTIVITIES

TVA With the election of President Roosevelt came the assurance that a greatly enlarged Federal forestry program would be encouraged and even before his inauguration plans for the *Tennessee Valley Authority* were being worked out. These

plans affect all of the watershed system draining into the Tennessee River including parts or all of some seventeen of the North Carolina mountain counties. The organization of this important activity very properly proceeded with more deliberation than most of the other relief activities. It is to be a permanent organization and a model for many other such organizations in the future life of this country. So far the actual activities have not yet greatly affected our mountain region though a number of local and community industries are receiving helpful coöperation from this Federal agency. The construction of water power units, the protection of drainage basins, the encouragement of farming on agricultural land and the fostering of local activities dependent upon natural resources as part of this program should confer permanent benefit on the region.

RFC During the winter and spring of 1932-33 extensive relief of the unemployed was conferred through the *Reconstruction Finance Corporation*. Forestry in North Carolina benefited to some extent through the direction of this labor into useful forestry channels. A number of men were supplied to the State Forest Nursery from the Johnston County authorities, which saved the State the expense of hiring its own men. These men were largely untrained and less effective than State employees would have been, but much satisfactory work was done.

In several counties the forest warden applied for relief men for fire line construction and many miles of effective fire lines were made, especially in Richmond, Scotland and Harnett counties. Some help also was received from this source for fire fighting in the spring of 1932.

CWA With the reorganization of relief, the *Civil Works Administration* was established and through the fall, winter and spring of 1933-34 considerable work was done with men secured through this agency. The State Forest Nursery again profited from this source securing three or four men throughout the winter for nursery work. Under the guidance of the district foresters and county forest wardens fire-suppression crews were organized from these federally-paid men. Such crews were usually kept close to lookout towers so that they might be immediately sent to extinguish any recently discovered fire. In some cases large numbers of relief men were put on fires, but as a rule the State's own field force was preferred for this somewhat dangerous and rather technical work.

The following report on CWA Projects relating to forest fire prevention for the winter and spring of 1933-34 will give a good idea of how Federal relief funds were distributed to the benefit of the forest as well as the family:

Haywood County: 4½ miles fire lane, 40 to 100 feet wide, around Waynesville city watershed; 40 men, 12,110 man-hours. City project without contract with State Forest Service. Total cost \$5,753.00.

Polk County: 35 miles fire trail, 30 feet wide; 25 men, 7,697 man-hours. State Forest Service assisted to small degree in securing approval of project. Total cost \$3,484.00.

Montgomery County: Uwharrie Truck Trail, 3 miles. Man-hours, foreman, etc., \$1,069.85. Tools (paid from CWA) \$63.90. Dynamite, fuse and caps, \$9.86. Total cost \$1,143.61.

Wilson County: Fire fighting, 4 men, 4,555 man-hours. Length of time on project, 4 months, 5 days. Total cost \$638.78.

Wayne County: Fire fighting, 16 men, 1,880 man-hours. Length of time on project, 1 month, 6 days. Total cost \$972.37.

Craven County: Fire fighting and burning 20 miles of fire lanes and cutting and burning 2 miles; 29 men, 4,053 man-hours. Length of time on project, 1 month, 23 days. List of tools for project: 6 axes, 24 bush hooks, 12 shovels. Cost of materials for project \$54.00. Amount paid to men as wages, \$2,485.20. Total cost \$2,539.20.

Bertie County: Fire fighting, 328 man-hours at 45c, \$147.60; 24 foremen-hours at 75c, \$18.00. Total cost \$165.60.

Edgecombe County: Fire crew at tower. 324 man-hours at 45c, \$145.80.

Gates County: (Partially completed) North-south Fire Break—Whiteoak-Pocosin—2,200 yards (1.25 miles) old railroad bed—brushed out 12 feet wide and hand-graded for minor truck trail. Men used, 14 per day. Total man-hours, 1,644. Average rate per hour 35c (rate of pay decreased as work progressed). Tools were CWA equipment that had been used on other projects. Cost of project \$594.97. Grand total \$15,437.33.

FERA The relief activities of the CWA came to an end March 31 and such relief as was still necessary was continued under the *Federal Emergency Relief Administration*. The forestry efforts of the Department were still favored and the fire suppression crews were kept on duty until the close of the spring fire season. No application was made for men for the nursery since the side camp was firmly established at the nursery and doing excellent work.

PWA In an attempt to aid cities and public corporations in recovery so that they might increase their employment of labor, large sums were made available through the *Public Works Administration*. The Forestry Division took active part in efforts to secure PWA loans on two or three occasions. The most notable was the request of the Waccamaw Lumber Company of Bolton, N. C., for a sufficient sum to enable it to become reestablished so that its former employees might be again employed. Arrangements were made between that company and the Department for the general supervision by the latter of forest protection and forestry management on 110,000 acres in Columbus and Brunswick counties. However, this and other applications for money from the same source by other lumber companies failed to receive approval.

Efforts were also made to secure with the aid of the PWA restoration projects including "the Banks" of Dare County. Plans for this project were presented before the State officials at Greenville and before the district authorities at Baltimore but without material result. While this organization has enabled many municipalities to carry on improvements, no direct benefits have accrued to the forests of the State therefrom.

Soil Erosion Service. In October, 1933, the Soil Erosion Service was set up in the Department of the Interior with H. H. Bennett, a North Carolinian, as Director. This new bureau was to be devoted to the control of soil erosion. Plans were made to "carry out on a number of strategically located areas a well rounded, coördinated, demonstrational program of soil erosion control." One of the first areas decided upon was in upper South Carolina. This Department having previously declined to place a CCC camp on the Deep River Watershed to carry on erosion control work such as had been done in Stokes and Wilkes counties, suggested that the Soil Erosion Service consider establishing a demonstrational area on Deep River or some other equally advantageous North Carolina stream. In coöperation with the State Agricultural Experiment Station reports and requests were made to the

Washington officials and early in January of the present year the Deep River and Brown's Creek projects in Guilford, Randolph and Anson counties were approved. These two areas, comprising some 150,000 acres, have been carefully studied and mapped and erosion control measures are now being carried on in coöperation with the owners of farms within the area and with the help of two CCC camps. One of these camps is located at High Point and the other one at Polkton.

Plans contemplate the coöperation of the farmers themselves in a gradual improvement of farming methods especially relating to the management of the soil. While gully erosion is not infrequent, the major problem is to control sheet erosion which goes on almost without the knowledge of the farmer. It is expected that considerable areas of submarginal farm land will be planted to trees, the existing forests will be protected from fire and improved, and cutting and marketing practices will be established. Small community industries dependent on the use of wood and other forest products will be encouraged and the protection and propagation of game will be made a part of the farm management plans. It is understood that this program is planned to cover a period of five years, at the end of which time the area will form an interesting demonstration to guide the various state and Federal agricultural agencies in their regular efforts to improve farm management.

Emergency Conservation Work. "On March 21, 1933, just seventeen days after his inauguration President Roosevelt submitted a message to Congress proposing legislation to help relieve distress, to build men, to accomplish constructive results in our vast federal, state and private forest properties." Ten days later Congress had enacted that legislation and on April 7 and 8 there were held in Washington meetings of representatives of every state to formulate plans for putting the Emergency Conservation Act into effect. The Director of this Department, Col. J. W. Harrelson, the State Forester, and the Assistant State Forester in charge of Forest Fire Control attended these meetings at which a preliminary plan for the location and employment of Civilian Conservation Camps was outlined. From that day forth until the present summer all of the forestry force of the Department has been largely engaged in the supervision and guidance of this work. At a meeting in Asheville of state foresters of the southeastern states May 19, more detailed plans were made for the location of camps and eleven camps on private land were requested. This request was approved in the following letter, which was immediately transmitted through the United States Forest Service to this Department:

May 29, 1933

THE HONORABLE
THE SECRETARY OF WAR:

DEAR MR. SECRETARY: This office has approved the establishment of eleven emergency conservation camps of 200 men each on privately owned land in North Carolina. The general locations of these proposed camps are shown on the accompanying list and map of that state. They are indicated by circles 51 to 61 inclusive.

It is suggested that the Commander of the Corps Area in which these camps will be situated consult with Mr. J. S. Holmes, State Forester, at Raleigh, N. C., on the selection of a suitable site for each of the camps and the order in which the camps should be established.

Very truly yours,

ROBERT FECHNER, *Director,*
Emergency Conservation Work.

The three major types of work to be carried on by these camps were to "help protect, develop, and perpetuate existing forests." To "help to prevent soil erosion which aggravates damage from floods" and to "help to establish new, and reëstab-

lish old, forests." Since the prevention of soil erosion was an important feature in some parts of this State it was decided to devote one full camp and one-half camp to this work, namely, those in Stokes and Wilkes counties, respectively. After twelve months or at the end of the second period, the soil erosion work was abandoned by the camps under the State Forester's supervision on private land since the Soil Erosion Service had become established in the State.

It was early decided that the United States Forest Service would handle the work of all camps established on national and state forests and all camps on private land. These latter were supervised directly by the state foresters who have in turn been responsible to the United States Forest Service. Camps located on state and national parks were to be supervised by the National Park Service.

Since an organization had to be built up immediately and responsible, efficient personnel selected it was natural that men and women who had worked in this Department and had shown their faithfulness and capacity should be selected since the reduction of appropriation had made it necessary to discontinue their services. F. H. Claridge, Assistant Forester, was recommended for appointment as Technician-Forester; B. W. Sipe, statistician for the Department, was made accountant; Mrs. Elsie Eason, Mrs. Elsie Dunn, and Mrs. Winona Brown were appointed on the ECW staff. The State Forester was appointed Collaborator in the United States Department of Agriculture so that he could assume the necessary responsibility for the proper expenditure of ECW funds. The selection of superintendents, foremen, and other supervisory and facilitating personnel for each camp was gradually made with results satisfactory to the federal authorities. After twelve to fifteen months operation it can be stated with assurance that the President's ECW plans have developed probably more ideally than any other emergency measure. The men have found themselves; forest protection and forest management have been emphasized and are taking their place in the thought of the public; and the families of the men have received regular emergency relief through the compensation allotted.

Work of the CCC. Since work in connection with the CCC camps has occupied a large part of the time, thought and energy of nearly all members of the Forestry Division for the last fifteen months of the biennium, some brief summary of the accomplishments seems necessary in this report. There is therefore appended the following condensed report of the Forester-Technician on the establishment of the eleven camps to work almost entirely on private land.

Report on Emergency Conservation Camps. On June 3 a notice was received from C. F. Evans, District Forest Inspector, Asheville, N. C., that the State would be allotted eleven Civilian Conservation Corps camps for work on private lands. Previous to this time some work had been done on locating the campsites, but the bulk of the work came after June 3, 1933. The first campsite was inspected on June 2 at Lake Waccamaw, and the men were on the campsite on June 10 and the first field work was done on June 12. The record of establishment and work of the camps follows:

Camp 51-P, Jackson Springs, Moore County; Thomas E. Winn, Camp Superintendent. This camp is composed of white war veterans. The campsite was inspected on June 30, 1933. The company arrived on the campsite on July 26. The first men were worked in the field on August 8. First tools were received on July 12 and 13.

The work undertaken by this camp consisted mainly of constructing a combination of truck trail and fire break 24 to 30 feet wide. From the establishment of the

camp until June 30, 1934, the following has been accomplished by this camp:

1,483 man days fighting forest fires
71.4 miles of truck trail and fire break
154 bridges constructed
71 water holes constructed
2 lookout towers built

Camp 52-P, Lake Waccamaw, N. C., Columbus County; Charles H. Hearn, Camp Superintendent. Work on Waccamaw Protective Association lands. This camp was inspected on June 2, 1933. Company arrived on campsite June 10. First men worked in the field on June 12. First tools were received on June 9.

The work from this camp consisted of construction of truck trails in the center of a fire break 100 feet wide. Along the edge of the fire break a plowed line was constructed, and the intention is to burn between these plowed lines each year. This is a different type from those constructed in other camps. During the period of establishment of this camp, which was from June 10, 1933, until May 31, 1934, the following was accomplished by this camp:

1,838 man days fighting forest fires
46.2 miles of truck trail constructed
27 bridges built
13 wells and water holes constructed
4.8 miles of telephone line constructed
172.8 miles of fire break constructed

Camp 53-P, on the Fort Bragg Military Reservation near Manchester, N. C.; Donald S. Stubbs, Camp Superintendent. This campsite was inspected on June 3, 1933. The camp established on June 14, 1933. The first men were worked in the field on July 10. First tools received on July 17. This camp completed through June 30, 1934, the following:

3,759 man days fighting forest fires
94.3 miles of truck trails
69 bridges
2 lookout towers
1 trailer shed

Truck trails constructed are combination of truck trail and fire break 30 feet wide as in the Jackson Springs Camp.

Camp 54-P, Walnut Cove, N. C., Stokes County; J. R. Herman, Camp Superintendent. This camp was established for the purpose of checking erosion in Stokes and adjoining counties. The campsite was inspected on June 23, 1933. Established on June 29. First men worked in the field on July 18 and the first tools received on July 17, 1933. The work from this camp consisted of constructing dams in the large gullies occurring in Stokes County. This took considerable engineering skill and the work of this camp was of a high standard. The following were the accomplishments of the camp from period of establishment until June 1, 1934, when the camp was moved to High Point, N. C.:

234 man days fighting forest fires
5,450 dams constructed
4,745 acres of land benefited

21,500 square yards banks protected
and planted with grass and trees
13,000 number of trees planted

Camp 55-P, North Wilkesboro, near Purlear, Wilkes County; T. A. Finley, Camp Superintendent. This camp was inspected on July 11, 1933. Established July 24. First men worked in the field August 7, and first tools received on July 18. This camp was divided in its activities, one-half the men doing erosion control work and half working on truck trails. The force working on truck trails spent a good portion of their time making the 18-foot width road through the top of Rendezvous Mountain State Park, a distance of 2.2 miles. This was a project undertaken with the advice of the State Highway Commission and the road will be taken over by the State Highway Commission shortly. Work accomplished by this camp up to June 30, 1934, is as follows:

1,672 man days fighting forest fires
6 miles of truck trail including Rendezvous
Mountain
82,968 square yards of banks protected and
planted to grass and trees
475 acres of land benefited
808 dams built

Camp 56-P, Durham, N. C., Durham County; H. J. Pawek, Camp Superintendent. Camp inspected on June 13 and 14. Company arrived at camp June 26. First men worked in the field on June 28 and the first tools received on July 8. Tools were borrowed from the Duke University and State College before the receipt of the government-owned tools.

The work of this camp has been varied in character. Work being done on Duke University Forest, the Hill Forest, property of State College, and on the lands belonging to the University of North Carolina, Chapel Hill. Work was also done on private lands in the county. The accomplishments of this camp up to June 30, 1934, are as follows:

475 man days fighting forest fires
17 miles truck trail constructed
53 bridges built
4 wells and water holes dug

This camp also worked on a large log cabin on the Hill Forest, constructed a cottage at the State Forest Nursery, put in a water system at the State Nursery, contributed 1,909 man days work at the State Nursery, improved 294 acres of forest land, planted 197 acres in forest trees, constructed one lookout tower and 5½ miles of telephone line.

Camp 57-P, Enola, N. C., Burke County; W. R. Patton, Camp Superintendent. This campsite was inspected on July 11, 1933, company arrived at camp on July 21. First men worked in the field July 26. First tools received on July 26. This camp has been concerned with the construction of truck trails in the South Mountains, which was inaccessible for fire fighting. These truck trails are mainly 10 to 12 feet in width and extend into rough country. It is also to do work on the State-owned land of the State Hospital at Morganton, N. C., and also on the Morganton city watershed. Up to June 30, 1934, this camp has completed the following:

875 man days fighting forest fires
 25.5 miles of truck trails
 14 bridges
 1 lookout tower
 1 lookout house
 17 miles foot trails
 17 miles telephone lines constructed

Camp 58-P, Stantonburg, N. C., Wilson County; T. B. Sugg, and F. P. Shore, Camp Superintendents. This camp was inspected on June 6, 1933. Company arrived at camp June 27. First men worked in the field June 29. First tools received on June 19. This camp from its establishment until June 11, 1934, when it was abandoned, completed the following work:

241 man days fighting forest fires
 101 miles of truck trail 16 feet wide
 67 bridges
 4½ miles of telephone line
 1 lookout tower

This camp had to be moved on account of lack of work in this vicinity.

Camp 59-P, Windsor, N. C., Bertie County; C. M. Newcomb, Superintendent. This campsite was inspected on June 6, 1933. Company arrived at camp June 19. First men worked in the field on June 27. First tools were received on June 19. The work from this camp consisted mainly of making truck trails 16 feet wide. Accomplishments of this camp up to June 30, 1934, are as follows:

944 man days fighting forest fires
 73 miles truck trail constructed
 35 bridges constructed
 2 water holes constructed
 1 lookout tower constructed
 200 bushels loblolly pine cones collected
 2 trailer sheds constructed

Camp 60-P, Hollister, N. C., Halifax County; R. D. Gladding, Camp Superintendent. This camp was composed of negro war veterans. The campsite was inspected on June 15 near Arcola, but this site was rejected on account of expense of obtaining water. The people of Warrenton turned a proposal to place this camp there on June 19 and 20. On June 24 a site was inspected at Enfield. This was rejected on account of the lack of work near Enfield. The Hollister campsite where the camp is located was inspected on August 25. Company arrived at camp on September 22. First men worked in the field on October 6. First tools and trucks were sent to the camp on September 26. Accomplishments of this camp from the period of establishment to June 30, 1934, consisted of:

1,024 man days fighting forest fires
 34.9 miles of truck trail constructed
 105 bridges constructed
 1 water hole built

Camp 61-P, Lake Lure, Rutherford County; Fred M. Slagle, Camp Superintendent. The campsite for this camp was inspected on July 10, 1933. Company

arrived July 21. First men worked in the field on August 1. First tools received on July 20. This camp is a white veterans' camp. The accomplishments of this camp up through June 30, 1934, from date of establishment are as follows:

174 man days fighting forest fires
 23.6 miles of truck trail through mountainous
 region width being 10 to 12 feet
 2 lookout towers completed
 22.8 miles telephone line constructed
 1 lookout house

SUMMARY

The main accomplishments for the eleven camps during the period ending June 30, 1934, are as follows:

12,489 man days fighting forest fires
 492.9 miles of truck trail constructed
 524 bridges constructed
 91 wells and water holes constructed
 54.6 miles telephone line constructed
 8 trailer sheds
 9 lookout towers

DIVISION OF GAME AND INLAND FISHERIES

Chapter 357, Public Laws of 1933, directed the consolidation of the offices of State Game Warden and Commissioner of Inland Fisheries, and the provisions of this act have been carried out.

With the merger of the two positions, the two executive Divisions formerly headed by the two officials have been consolidated under the direction of the one individual and has been given the title of the Division of Game and Inland Fisheries.

John D. Chalk, of Rockingham, N. C., was elected by the Board of Conservation and Development to the combined office and began his duties on April 15, 1934, as the first State Game and Inland Fisheries Commissioner. Because of his short period in office and the limited time available, this report is being made in brief form.

Game and fish are among the most valuable natural resources of the State, and the public is becoming more cognizant of their worth to the people of this as well as those of other states who are attracted here to do their fishing and hunting. Game and fish have had a recognized food value from the beginning of time. Our forefathers subsisted largely on the game from the fields and forests and the fish from the streams. The increase in population of the country and this State, bringing a greater number of hunters and fishermen, has naturally reduced the supply of game and fish and made necessary a program of conservation, which is gladly accepted by most of the citizens of North Carolina.

The Federal wild life measures instituted by the last Congress of the United States have been helpful in convincing the people of the State of the need of a more adequate conservation policy and have had the effect of increasing their interest and enlisting their coöperation in our own problems. North Carolina has at the present time more wild life in its fields and forests and more fish in its streams than most any other state in the Union and the restrictions in the way of bag limits, closed seasons, etc., are more liberal than most states. License fees are low and within reach of all who may wish to hunt or fish for food or for pleasure. The shorter working hours of the present day create more time for recreation and pleasure, and, consequently, increase the number of those who have time to seek the natural pleasure of hunting and fishing.

Game: The major activities of this feature of the Program are: (1) Education, (2) Propagation, and (3) Law Enforcement. For these purposes a warden service is maintained throughout the State. Five District Wardens and 105 County and Refuge Wardens make up the field force. The warden service since the last biennium has been at a low ebb due to the lack of funds, but collections are increasing and the activities of the wardens are greater, thereby bringing about better application of the regulations and better coöperation from the people generally.

The brooders and incubators used at the Asheboro Game Farm, which was abandoned during this biennium, have been divided between the Mount Mitchell Refuge and the Fayetteville Game Farm, where excellent results in the raising of quail at a small cost are being obtained. Sufficient quail are being produced to restock the refuges and auxiliary refuges throughout the State.

The Game Farm at Mount Mitchell Refuge has been equipped almost entirely from CWA funds and is a valuable addition to the program from an educational standpoint as well as in the restocking of the refuges in the western part of the State with game birds and game animals native to that locality. Increase of game on the refuges naturally brings about the restocking of the surrounding territory.

HUNTING LICENSE COLLECTIONS—SEASON 1932-33

COUNTY	Non-Resident Licenses	State Licenses	County Licenses	Total Receipts	Fur Dealers' Licenses
Alamance.....	8	269	42	\$ 1,794.25	\$.....
Alexander.....		40	112	239.50	.....
Alleghany.....	2	35	192	366.50	.....
Ashe.....	1	5	448	469.50	.....
Anson.....	4	54	430	693.50	.....
Avery.....	1	47	306	476.50	.....
Beaufort.....	26	23	819	1,976.00	20.00
Bertie.....	7	116	714	1,196.75	20.00
Bladen.....	5	118	498	933.25	10.00
Brunswick.....		202	452	1,079.62	.....
Buncombe.....	3	772	2,474	4,896.25	30.00
Burke.....		111	420	794.00	.....
Cabarrus.....		250	459	1,276.75	.....
Caldwell.....		86	512	770.50	.....
Camden.....	10	48	197	524.50	.....
Carteret.....	60	111	490	1,769.75	.....
Catawba.....		197	362	991.50	.....
Chatham.....	44	89	279	1,139.25	10.00
Caswell.....	7	30	331	526.00	.....
Cherokee.....		87	280	546.00	.....
Clay.....		2	63	69.00	.....
Chowan.....	5	43	155	361.00	85.00
Cleveland.....		177	504	1,046.00	.....
Columbus.....	36	133	751	1,784.25	125.00
Craven.....	34	321	1,033	2,279.25	240.00
Cumberland.....	6	268	680	1,620.25	60.00
Currituck.....	19	22	318	766.50	.....
Dare.....	1	1	35	82.00	.....
Davidson.....	18	173	670	1,473.75	.....
Davie.....		65	524	728.25	.....
Duplin.....	7	215	533	1,298.75	30.00
Durham.....		788	568	2,964.00	.....
Edgecombe.....	10	345	934	2,236.50	125.00
Franklin.....	1	42	321	373.00	.....
Forsyth.....	2	877	1,020	3,778.25	10.00
Gaston.....		289	373	1,248.75	.....
Gates.....	12	35	447	764.00	20.00
Granville.....	4	55	248	479.50	.....
Graham.....	5	11	161	270.25	.....
Greene.....		43	145	302.75	.....
Guilford.....	17	1,009	1,082	4,440.25	.....
Halifax.....	13	354	1,370	2,682.00	150.00
Harnett.....	11	153	447	1,113.00	10.00
Haywood.....	1	148	815	1,281.50	.....
Henderson.....		127	769	1,150.50	10.00
Hertford.....	13	66	519	925.75	40.00
Hoke.....		43	269	414.00	.....
Hyde.....	4	20	269	468.50	.....
Iredell.....		144	1,123	1,583.50	.....
Jackson.....		39	275	392.00	.....
Johnston.....	2	117	1,326	1,764.50	.....
Jones.....	2	41	404	578.75	.....
Lee.....		90	179	463.00	.....
Lenoir.....	6	338	510	1,770.00	105.00
Lincoln.....		42	85	231.50	.....
Macon.....		15	325	371.25	.....

HUNTING LICENSE COLLECTIONS—SEASON 1932-33—Continued

COUNTY	Non-Resident Licenses	State Licenses	County Licenses	Total Receipts	Fur Dealers' Licenses
Madison.....	2	10	149	\$ 209.00	\$.....
Martin.....	3	124	539	984.00	20.00
McDowell.....	1	81	416	686.50	.....
Mecklenburg.....	1	624	1,062	3,019.00	.....
Mitchell.....	.....	38	342	501.75	.....
Montgomery.....	4	91	195	553.25	.....
Moore.....	37	170	428	1,516.75	.....
Nash.....	2	388	956	2,226.25	.....
Northampton.....	8	57	988	1,314.00	125.00
New Hanover.....	7	358	235	1,419.00	20.00
Onslow.....	24	82	510	1,199.25	10.00
Orange.....	.....	115	402	771.25	.....
Pamlico.....	14	63	189	593.50	.....
Pasquotank.....	2	131	243	691.75	115.00
Pender.....	25	75	601	1,222.00	.....
Person.....	3	14	186	276.75	.....
Perquimans.....	5	14	253	386.25	.....
Pitt.....	1	294	511	1,474.50	50.00
Polk.....	1	29	162	266.50	.....
Randolph.....	21	180	349	1,256.50	10.00
Richmond.....	1	159	378	892.25	85.00
Robeson.....	28	141	806	2,094.25	70.00
Rockingham.....	.....	231	1,726	2,443.75	.....
Rowan.....	1	254	564	1,367.25	.....
Rutherford.....	.....	113	747	1,117.25	.....
Sampson.....	2	69	495	741.75	50.00
Scotland.....	1	49	128	301.25	.....
Stokes.....	1	21	244	312.50	.....
Stanly.....	.....	134	242	670.25	.....
Surry.....	2	85	547	845.75	.....
Swain.....	3	15	149	239.00	.....
Transylvania.....	7	21	242	418.75	10.00
Tyrrell.....	1	10	128	186.50	.....
Union.....	2	41	550	717.50	.....
Vance.....	3	186	796	1,433.00	75.00
Wake.....	20	548	1,229	2,995.25	.....
Warren.....	3	79	923	1,209.50	.....
Washington.....	3	74	247	525.75	20.00
Watauga.....	1	33	520	647.25	10.00
Wayne.....	6	269	843	1,856.75	95.00
Wilkes.....	.....	55	396	577.50	10.00
Wilson.....	2	290	693	1,625.75	.....
Yadkin.....	.....	17	122	174.00	.....
Yancey.....	2	35	260	395.00	.....
Grand Total.....	656	15,208	50,758	\$110,281.37	\$ 1,875.00

HUNTING LICENSE COLLECTIONS—SEASON 1933-34

COUNTY	Non-Resident Licenses	State Licenses	County Licenses	Total Receipts	Fur Dealers' Licenses
Alamance.....		527	1,386	\$ 1,800.00	\$ 10.00
Alexander.....		25	171	165.60	25.00
Alleghany.....		32	328	278.30	20.00
Ashe.....		2	363	256.50	65.00
Anson.....	6	71	1,175	819.80	
Avery.....	2	53	407	357.20	10.00
Beaufort.....	3	290	1,152	1,197.40	
Bertie.....	10	118	1,038	1,007.30	110.00
Bladen.....	6	164	1,250	1,049.50	20.00
Brunswick.....	3	50	684	497.00	10.00
Buncombe.....	14	1,048	4,032	4,577.50	30.00
Burke.....	2		1,180	963.90	25.00
Cabarrus.....		219	347	950.06	
Caldwell.....		152	1,628	1,171.20	15.00
Camden.....	15	68	306	460.10	
Carteret.....	51	105	661	1,101.50	10.00
Catawba.....		299	591	960.20	
Caswell.....	5	30	458	339.00	
Chatham.....	60	103	1,110	1,404.90	25.00
Cherokee.....		128	458	572.90	60.00
Clay.....		3	75	58.50	15.00
Chowan.....	4	74	355	407.40	25.00
Cleveland.....		306	1,181	1,229.60	
Columbus.....		71	1,005	736.40	85.00
Craven.....	40	256	930	2,742.30	175.00
Cumberland.....	4	474	1,382	1,862.20	130.00
Currituck.....	28	21	423	606.50	
Dare.....		2	21	19.00	
Davidson.....	16	343	1,638	1,700.65	
Davie.....		114	718	593.00	
Duplin.....	5	137	865	760.00	
Durham.....		1,193	1,039	2,977.70	
Edgecombe.....	9	482	1,789	2,187.60	70.00
Franklin.....		70	613	479.30	10.00
Forsyth.....	1	1,382	1,907	3,849.80	10.00
Gaston.....		676	1,291	2,035.30	
Gates.....	29	56	779	867.20	55.00
Granville.....	6	58	272	336.40	10.00
Graham.....	3	18	325	230.41	
Greene.....		77	329	350.90	
Guilford.....	22	1,636	1,984	4,621.40	25.00
Halifax.....	19	593	3,079	3,217.10	215.00
Harnett.....	13	303	985	1,285.10	10.00
Haywood.....	5	211	1,189	1,189.10	65.00
Henderson.....		176	1,324	1,044.30	10.00
Hertford.....	13	95	1,080	954.00	60.00
Hoke.....		65	563	426.30	
Hyde.....	9	15	239	267.50	25.00
Iredell.....	4	192	2,344	1,636.10	10.00
Jackson.....		45	444	331.80	
Johnston.....		234	2,980	2,037.90	10.00
Jones.....		81	668	517.70	10.00
Lee.....	1	130	343	459.70	
Lenoir.....	5	350	589	1,179.20	
Lincoln.....		104	208	356.80	
Macon.....		16	478	276.00	5.00

HUNTING LICENSE COLLECTIONS—SEASON 1933-34—Continued

COUNTY	Non-Resident Licenses	State Licenses	County Licenses	Total Receipts	Fur Dealers' Licenses
Madison.....	1	6	312	\$ 183.00	\$ 5.00
Martin.....	4	187	1,028	990.70	25.00
McDowell.....	1	101	843	644.30	-----
Mecklenburg.....	1	969	2,773	3,533.00	-----
Mitchell.....	-----	30	343	238.70	-----
Montgomery.....	5	117	524	570.10	-----
Moore.....	41	229	197	1,290.60	-----
Nash.....	1	520	1,706	2,015.30	5.00
Northampton.....	4	84	1,662	1,102.10	55.00
New Hanover.....	4	436	489	1,603.10	20.00
Onslow.....	18	102	790	820.30	20.00
Orange.....	-----	156	636	664.70	-----
Pamlico.....	15	48	317	419.50	5.00
Pasquotank.....	12	186	454	981.80	250.00
Pender.....	1	97	949	687.97	-----
Person.....	5	24	221	210.50	-----
Perquimans.....	6	18	400	297.50	-----
Pitt.....	1	444	1,340	1,766.50	70.00
Polk.....	-----	28	401	264.30	-----
Randolph.....	28	127	304	804.50	100.00
Richmond.....	-----	264	1,170	1,155.60	5.00
Robeson.....	12	387	2,176	2,151.70	70.00
Rockingham.....	-----	540	2,139	1,645.50	-----
Rowan.....	-----	343	836	1,144.50	-----
Rutherford.....	-----	123	1,701	1,122.10	-----
Sampson.....	-----	97	287	584.70	35.00
Scotland.....	1	62	460	370.30	-----
Stokes.....	-----	33	406	275.70	-----
Stanly.....	-----	323	1,055	1,240.40	-----
Surry.....	4	108	838	686.10	-----
Swain.....	3	21	188	171.40	-----
Transylvania.....	21	18	359	464.10	35.00
Tyrrell.....	4	-----	93	96.50	10.00
Union.....	-----	65	1,199	753.70	5.00
Vance.....	3	273	1,146	1,191.90	-----
Wake.....	4	644	2,392	3,305.00	117.00
Warren.....	2	133	2,074	1,347.40	-----
Washington.....	2	124	588	784.50	190.00
Watauga.....	-----	26	497	366.20	50.00
Wayne.....	2	378	1,531	1,731.50	60.00
Wilkes.....	-----	52	432	423.90	85.00
Wilson.....	-----	419	1,191	1,532.40	10.00
Yadkin.....	-----	37	196	179.30	-----
Yancey.....	-----	35	181	161.40	25.00
Grand Total.....	619	22,124	92,983	\$105,734.49	\$ 2,717.00

PROPAGATION LICENSES
(To keep game birds in captivity)
JUNE 30, 1932 to JULY 1, 1933

George T. McArthur, Kinston
G. A. Yelverton, Fremont
R. J. Patterson, State Road
Donnie Hart, Siler City, Route 5
Mrs. Hattie Stout, Siler City, Route 3
George Roberts, Siler City
Carl Phillips, Siler City
Len Paschal, Siler City
Blue Ridge Silver Fox Ranch, Brevard
J. J. Larew, Mocksville
Milton Norman, Box 1211, Raleigh
Dr. Jesse J. Everett, Charlotte, Veterans Administration
W. V. Powell, Ridgecrest
T. E. Carpenter, Claremont

JUNE 30, 1933 TO JULY 1, 1934

L. H. Coley, 115 E. Miller St., Salisbury
E. G. Barker, Apex, Route 1
R. L. Whitaker, Jr., Salisbury
R. D. Herndon, Chapel Hill, Box 202
G. W. Willcox, Sanford
Dr. M. Szamatolski, Fletcher
R. C. Haberkern, Winston-Salem, Box 112
Dr. H. H. Fries, Tillery
H. F. Hauser, Winston-Salem, 707 Brockstown Ave.
Mrs. Jas. R. Erwin, Charlotte, Route 9
A. G. Gordon, Winston-Salem
W. E. Davidson, Swannanoa
Hon. Joseph P. Knapp, Currituck County
Frank W. Fuller, Salisbury
Miss Sallie Stribling, Lake Toxaway
J. J. Larew, Mocksville
T. E. Carpenter, Claremont
J. E. Fox, Siler City

PERMITS TO KEEP GAME ANIMALS

JUNE 30, 1932 to JULY 1, 1933

Hune Glarrett, Grand View
A. W. Craven, High Point
C. E. Graham, Council
W. R. Jones, Roxboro
Gordon Page, Apex
J. G. Harris, Stovall
E. F. Nanney, Black Mountain
E. W. Stovall, Stovall
Jerry Clark, Chocowinity
Mrs. Nettie Dickey, Murphy, the Dickey Hotel

Frank Cogburn, Canton
 William Norvell, Seaboard
 L. I. Currin, Granville or Person County
 J. E. Killiam, Waynesville
 James A. Houston, Mount Mourne
 T. B. Dail, Raleigh, 113 Oberlin Road
 Kenneth Dunbar, Leechville
 J. E. Mendenhall, Winston-Salem, Route 4
 Lea Travis, Snowden, care P. N. Bray
 Lacy Buie, Red Springs
 Ed Stiles, Cruso
 Mrs. Mary Gold, Lattimore, Route 1
 Russell McKinley, Washington
 Dr. W. W. Johnston, Manteo
 G. D. Manning, Rocky Mount
 B. B. Knight, Roxboro
 W. M. Ferrell, Nashville, Box 336
 G. A. Jones, Leland
 A. J. Jones, Postell

JUNE 30, 1933 TO JULY 1, 1934

S. S. Clapp, Washington
 A. J. Hemphill, Black Mountain
 Clyde S. Brown, Brevard, Route 1
 E. T. Parker, Winton
 Jos. S. Mann, Fairfield
 H. B. Mehaffey, Canton
 George Tocci, Charlotte
 Edwin Fincher, Clyde
 Isaac Freeman, Hendersonville
 W. F. Bridgers, Asheville
 R. L. Elders, Whittier, R. F. D.
 W. C. Stewart, Asheville, Route 1
 A. C. Rhundy, Asheville
 Edwards Bros. Fur Farm, Whitehead
 Carl Irwin, Sparta
 W. L. Goolsby, Canton
 J. C. Clark, Canton
 S. W. King, Canton
 M. M. Redden, Henderson County
 Z. E. Henderson, Asheville, 135 Rankin Ave.
 Joe Trull, Canton
 Joe Michael, Canton
 T. E. Wright, Asheville, 45 Victoria Road
 W. T. Smith, Canton
 Pink Lance, Asheville, Route 3
 Edgar H. Tufts, Banner Elk
 J. J. Ramsaur, Winnabow
 David Peterson, Asheville, Route 3
 Mountain Sanitarium, Fletcher
 Fred J. West, West Asheville

Walter Wright, Canton, Route 1
 Ellis Gowan, Clyde, Route 1
 P. L. Choate, Sparta

WILD LIFE COLLECTING PERMITS

JUNE 30, 1932 TO JULY 1, 1933

Mrs. W. C. Blake, Lumberton
 C. D. Brothers, Lumberton
 Charles L. Jones, Weldon
 Clarence Cottam, Biological Survey, Washington, D. C.
 W. C. McCormick, Jacksonville, Fla.
 J. E. Derrick, Bladenboro
 James S. Gutsell, Bureau of Fisheries, Beaufort

JUNE 30, 1933 TO JULY 1, 1934

J. E. Derrick, Lake Waccamaw
 V. F. Kelly, Jr., 212 Maple St., Fayetteville
 Fuller Stroud, Whiteville Museum, Whiteville
 A. Breckenridge, Chapel Hill
 S. B. Etheridge, Washington
 A. R. Masters, Asheville
 T. G. Samworth, Marines
 F. Bach Sellers, Washington
 Gaston Pearce, Raleigh
 G. F. Ivey, Hickory
 Lees-McRae College, Banner Elk
 W. S. Crain, Poplar Branch
 Harold S. Peters, U. S. Dept. Agriculture, Washington, D. C.
 Clarence Cottam, Biological Survey, Washington, D. C.
 Reinard Harkema, Duke University, Durham
 Aldon L. Whiteside, Weaverville
 H. B. Teague, Biltmore Schools, Asheville
 Dr. Ben F. Royal, Morehead City
 Ethel B. Finster, Asheville
 Leland J. W. Jones, Asheville
 Harry T. Davis, Raleigh
 H. H. Brimley, Raleigh
 W. A. Nesbitt, Arden
 G. Robert Lunz, Jr., Charleston, S. C.
 A. Wetmore, Washington, D. C.
 Edward I. Williams, Fairmont
 R. M. McKenzie, Gastonia
 Biltmore Estate, Biltmore
 Henry C. Havemeyer, 25 Broadway, New York, N. Y.

DISTRIBUTION OF GAME FROM STATE GAME FARM

JUNE 30, 1932, UNTIL CLOSE OF FARM IN DECEMBER, 1933

<i>Quail</i>	<i>Pheasants</i>	<i>Turkeys</i>
814	668	130

GAME LAW PROSECUTIONS

	No. Cases	Fines	Costs	Total
July 1, 1932 to June 30, 1933.....	1,000	\$ 1,442.64	\$ 6,480.13	\$ 7,922.77
July 1, 1933 to June 30, 1934.....	412	709.89	2,949.80	3,659.69

Inland Fisheries: One of the most important phases of this program is the operation of the State hatcheries. Those at Waynesville, Boone and Roaring Gap are restricted to the production of trout species:—Brown, Rainbow and Brook, for distribution in the mountain streams in the western part of the State. The Marion Hatchery propagates Rainbow and Brown trout, bass and bream; and the Fayetteville Hatchery, which is the largest in the State, is operated for the hatching and rearing of bream and black bass. With the improved methods of fish culture, the output of these hatcheries is gradually being increased in an effort to meet the mounting demand throughout the State for fish to restock ponds and streams. The increase in the leisure hours of working people has made it possible for a great many more people to indulge in the popular pastime of fishing and has directly brought about a tremendous increase in the demands on the Department for fish for restocking. Plans are being laid to expand further the facilities at the various hatcheries in an effort to meet the growing demand from the public for fish.

The activities of this program, like that of the game program, may be divided into (1) Education, (2) Propagation and (3) Law Enforcement, and in the application of these three purposes the same county and refuge warden organization is used.

The principal handicap of this work is that there is not sufficient revenue derived from fishing licenses to operate the hatcheries. This biennium will show a deficit in the fish program, although there is no part of the work of the Department of Conservation and Development in which there is more general demand from the people over the State for service. Putting the County fishing license on a county optional basis is the cause of the decline in the income of this Division. If the Inland Fisheries program is to make an attempt to keep abreast of the demands of the people of the State, the county fishing license should be reinstated in those counties in which it was abolished. The following counties have retained the county license during the past biennium:

Alleghany	Haywood	Moore
Ashe	Henderson	Polk
Avery	Iredell	Rutherford
Buncombe	Jackson	Swain
Burke	Macon	Transylvania
Caldwell	McDowell	Watauga
Cherokee	Madison	Wilkes
Clay	Mitchell	Yancey

FISHING LICENSE RECEIPTS BY COUNTIES—CALENDAR YEAR 1932

COUNTY	Non-Resident	State	County	Total Receipts
Alamance.....		13		\$ 26.00
Alexander.....		4		8.00
Alleghany.....		31	108	175.50
Ashe.....	1	8	88	108.00
Anson.....		32		64.00
Avery.....	61	142	215	797.00
Beaufort.....		11		22.00
Bertie.....		29		58.00
Bladen.....		12		24.00
Brunswick.....	2	10		30.00
Buncombe.....	28	1,387	964	3,897.00
Burke.....	4	333	600	1,292.50
Cabarrus.....		119		238.00
Caldwell.....	1	209	282	698.95
Camden.....		1		2.00
Carteret.....		1		2.00
Catawba.....		132		264.00
Caswell.....	5	11		47.00
Chatbam.....		13		26.00
Cherokee.....	13	167	63	502.00
Clay.....	4	28	67	97.00
Chowan.....	1	3		11.00
Cleveland.....		219		438.00
Columbus.....	4	64		148.00
Craven.....	6	86		202.00
Cumberland.....		57		114.00
Currituck.....	8	3		46.00
Dare.....				
Davidson.....		102		204.00
Davie.....				
Duplin.....		35		70.00
Durham.....		110		220.00
Edgecombe.....	2	132		274.00
Franklin.....		5		10.00
Forsyth.....	1	413		831.00
Gaston.....		110		220.00
Gates.....				
Granville.....		16		32.00
Graham.....	129	45		735.00
Greene.....		14		28.00
Guilford.....	3	195		405.00
Halifax.....	2	77		164.00
Harnett.....		100		200.00
Haywood.....	4	288	445	1,031.00
Henderson.....	16	245	486	971.00
Hertford.....		21		42.00
Hoke.....		11		22.00
Hyde.....				
Iredell.....	1	88		181.00
Jackson.....	37	109	201	602.00
Johnston.....		77		154.00
Jones.....		3		6.00
Lee.....		19		38.00
Lenoir.....	1	248		501.00
Lincoln.....		42		84.00
Macon.....	20	59	377	593.50

FISHING LICENSE RECEIPTS BY COUNTIES—CALENDAR YEAR 1932—Continued

COUNTY	Non-Resident	State	County	Total Receipts
Madison.....	2	73	257	\$ 413.00
Martin.....		26		52.00
McDowell.....	3	108	464	640.40
Mecklenburg.....		222		440.00
Mitchell.....		156	59	364.50
Montgomery.....		104		208.00
Moore.....		75	137	287.50
Nash.....		40		80.00
Northampton.....		35		70.00
New Hanover.....	2	69		148.00
Onslow.....		11		22.00
Orange.....		43		86.00
Pamlico.....		3		6.00
Pasquotank.....	1	3		11.00
Pender.....		24		48.00
Person.....		22		44.00
Perquimans.....		3		6.00
Pitt.....		89		178.00
Polk.....	65	69	190	610.50
Randolph.....		16		32.00
Richmond.....	1	57		119.00
Robeson.....		25		50.00
Rockingham.....	6	60		150.00
Rowan.....		60		120.00
Rutherford.....	22	353	301	1,142.50
Sampson.....		16		32.00
Scotland.....		16		32.00
Stokes.....				
Stanly.....		49		98.00
Surry.....		15		30.00
Swain.....	16	89	252	509.00
Transylvania.....	21	79	178	441.00
Tyrrell.....				
Union.....		20		40.00
Vance.....		14		28.00
Wake.....	8	179		398.00
Warren.....		4		8.00
Washington.....	10			20.00
Watauga.....	18	60	232	390.00
Wayne.....		187		374.00
Wilkes.....		41	115	197.00
Wilson.....		179		358.00
Yadkin.....		4		8.00
Yancey.....		18	35	71.00
Grand Total.....	521	8,410	6,116	\$ 25,317.85

FISHING LICENSE RECEIPTS BY COUNTIES—CALENDAR YEAR 1933

COUNTY	Non-Resident	State	County	Total Receipts
Alamance.....		10		\$ 20.00
Alexander.....				
Alleghany.....	2	19	70	120.00
Ashe.....		7	53	66.00
Anson.....		33		66.00
Avery.....	122	88	203	462.00
Beaufort.....		11		22.00
Bertie.....				
Bladen.....		9		18.00
Brunswick.....	1	3		11.00
Buncombe.....	59	875	489	2,372.00
Burke.....	333	187	265	805.50
Cabarrus.....		39		78.00
Caldwell.....	10	145	150	447.50
Camden.....		1		2.00
Carteret.....		1		2.00
Catawba.....	10	74		153.00
Caswell.....	9	5		19.00
Chatham.....	1	3		6.50
Cherokee.....	12	151	21	351.50
Clay.....		7	39	35.00
Chowan.....		2		4.00
Cleveland.....	10	166		337.00
Columbus.....	3	4		23.00
Craven.....	11	27		73.00
Cumberland.....		17		34.00
Currituck.....	11	1		21.00
Dare.....				
Davidson.....	2	56		113.00
Davie.....		1		2.00
Duplin.....		26		52.00
Durham.....		55		110.00
Edgecombe.....		60		120.00
Franklin.....				
Forsyth.....		207		414.00
Gaston.....		68		136.00
Gates.....		2		4.00
Granville.....		14		28.00
Graham.....	923	20		605.00
Greene.....		9		18.00
Guilford.....		101		202.00
Halifax.....	3	43		101.00
Harnett.....		28		56.00
Haywood.....	17	215	388	819.00
Henderson.....	615	158	212	846.50
Hertford.....		4		8.00
Hoke.....				
Hyde.....				
Iredell.....		73		146.00
Jackson.....	109	96	117	390.50
Johnston.....		40		80.00
Jones.....		1		2.00
Lee.....		11		22.00
Lenoir.....	6	172		247.00
Lincoln.....		37		74.00
Macon.....	61	30	221	362.50

FISHING LICENSE RECEIPTS BY COUNTIES—CALENDAR YEAR 1933—Continued

COUNTY	Non-Resident	State	County	Total Receipts
Madison.....	1	13		\$ 26.50
Martin.....	1	18		36.50
McDowell.....	31	48	195	330.80
Mecklenburg.....	2	128		195.50
Mitchell.....		38	6	82.00
Montgomery.....		43		86.00
Moore.....	1	10		25.00
Nash.....	1	24		48.50
Northampton.....		18		36.00
New Hanover.....		55		110.00
Onslow.....		7		14.00
Orange.....	1	36		72.50
Pamlico.....				
Pasquotank.....	1	8		16.50
Pender.....				
Person.....		5		10.00
Perquimans.....	1	1		2.50
Pitt.....	3	63		127.80
Polk.....	246	60	70	376.50
Randolph.....		15		30.00
Richmond.....	1	33		71.00
Robeson.....	3	36		73.50
Rockingham.....		35		70.00
Rowan.....		34		68.00
Rutherford.....		37	10	84.00
Sampson.....		10		20.00
Scotland.....		4		8.00
Stokes.....		6		12.00
Stanly.....		66		132.00
Surry.....		7		14.00
Swain.....	81	57	211	433.00
Transylvania.....	58	39	67	196.50
Tyrrell.....				
Union.....		7		14.00
Vance.....		6		12.00
Wake.....	7	85		205.00
Warren.....		2		4.00
Washington.....		2		4.00
Watauga.....	27	30	70	161.50
Wayne.....	3	98		197.50
Wilkes.....	5	27	51	107.50
Wilson.....		110		220.00
Yadkin.....				
Yancey.....	1	11	63	85.60
Totals.....	2,805	4,744	2,998	\$ 14,326.70

FISH DISTRIBUTION FROM STATE FISH HATCHERIES

FOR BIENNIUM, JULY 1, 1932 TO JUNE 30, 1934

Morrison Hatchery, Waynesville, N. C.

	1932-33	1933-34	Total
Rainbow Trout.....	114,400	256,600	371,400
Brook Trout.....	896,240	743,500	1,639,740
Yearlings and adult brook and rainbow.....		15,055	15,055
Totals.....	1,010,640	1,015,155	2,026,195

Roaring Gap Hatchery, Roaring Gap, N. C.

	1932-33	1933-34	Total
Brook Trout.....	490,700	371,400	862,100
Brown Trout.....	176,000	156,000	332,000
Rainbow Trout.....		61,000	61,000
Totals.....	666,700	588,400	1,255,100

"Pete" Murphy Hatchery, Marion, N. C.

	1932-33	1933-34	Total
Rainbow Trout.....	215,000	239,000	454,000
Bass.....	75,335	61,500	136,835
Bream.....	21,000	67,050	88,050
Brown Trout.....	111,000	17,500	128,500
Totals.....	422,335	385,050	807,385

Frank Stedman Hatchery, Fayetteville, N. C.

	1932-33	1933-34	Total
Bass.....	102,175	137,312	239,487
Bream.....	15,936	7,984	23,920
Totals.....	118,111	145,296	263,407

Boone Fish Hatchery, Boone, N. C.

	1932-33	1933-34	Total
Brook Trout.....	536,000	580,000	1,116,000
Brown Trout.....	230,000	302,000	532,000
Rainbow Trout.....	95,000	139,000	234,000
Totals.....	861,000	1,021,000	1,882,000

PROSECUTIONS FOR INLAND FISHERIES VIOLATIONS

	No. Cases	Fines	Costs	Total
July 1, 1932 to June 30, 1933.....	640	\$ 1,194.21	\$ 4,721.96	\$ 5,916.17
July 1, 1933 to June 30, 1934.....	484	998.35	2,836.28	3,834.63

Conclusion: The apparent improvement in economic conditions and also increased interest of the people in the wild life program calls for enlarged activities along this line and improvement in the application of the laws and regulations applying to game and fish.

One of the drawbacks to the program is the public local laws that have been passed by some of the counties. These stand in the way of the general application of a broader State-wide program, which in the end is the most beneficial to all counties. Just a few years ago the Department of Conservation and Development faced the problem of convincing the people of the State of the worth of the conservation program for fish and game, but the Department has now reached the point where it is face to face with the problem of keeping abreast of the demands made upon it. The problem which a few years ago was almost entirely one of educational efforts has now developed largely into an operating problem of great significance to the people of the State.

DIVISION OF MINERAL RESOURCES

During the period, July 1, 1932 to June 30, 1934, the work of the State Geologist has been greatly hindered on account of the small appropriation granted by the 1931 and 1933 sessions of the State Legislature. The total appropriation for the entire Division is only \$4,452.00 per year. Due to the small allowance, very little field work has been accomplished. No funds were available for topographic and geologic mapping, underground water investigations, or other similar field work that would aid or promote the mineral industry of the State.

Due to the increase in the price of gold from \$20.67 per ounce to \$35.00 per ounce, the number of inquiries regarding gold deposits has been greater than for the last twenty-year period. Since all of the old reports are out of print and no longer available for distribution, and since no travel allowance was granted by the last Legislature to make field investigations along these lines, little information of value relative to such deposits has been sent out.

Approximately 1,000 mineral and rock specimens were received by the Division and reported upon. This is an increase of more than 200 over the previous biennium. The work of collecting and indexing statistics of the State mineral production has been carried on in coöperation with the U. S. Bureau of the Census.

During the past year a publication entitled "Physiography, Geology, Rocks and Minerals of North Carolina" has been in preparation and is now about ready for the printer. This publication gives a brief statement relative to the physiography of the State, more or less complete information on the geology of the State, the classification, description, distribution and uses of the rocks and minerals found in the State. When this publication is off the press it will be the first of this kind ever prepared in North Carolina and will be of great value as a reference book. It will consist of four or five hundred pages, illustrated with drawings, maps, and photographs.

The Division of Mineral Resources, in coöperation with the FERA, is gathering information on the ground water resources of the State. As soon as this information has been collected, more or less in detail on every county in the State, a publication entitled "Ground Water Resources of North Carolina" will be prepared. A great many small towns, industries of various types, schools throughout the State, and homes in North Carolina are dependent upon ground water for their water supply. It is estimated that more than one hundred million gallons of water are used daily by the above in North Carolina, and in view of this fact, a publication on the ground water resources will be of great value in locating water supplies from underground sources.

Much time is spent in the office preparing reports on the field work carried on at various times. However, during the last biennium, due to the fact that only \$900.00 per year was appropriated for such work, very little field work was carried on. However, the value of the field work depends to a great extent upon the nature of the reports covering it.

In June, 1934, the State Geologist prepared an illustrated lecture for the Water Plants School held at Chapel Hill. One session of the School was devoted entirely to wells, their construction, maintenance, and operation.

METALLIC MINERALS

Gold and Silver. Due to the increase in the price of gold from \$20.67 to \$35.00 per ounce, a great deal of information has been requested by various individuals and companies relative to the gold bearing formations throughout the State. Some of the larger companies have spent considerable money in the State doing further prospecting to determine the value and extent of the gold deposits. One engineer stated that his company had spent over \$40,000.00 during the latter part of the year 1933 in gold investigation work in North Carolina. At the present time, four or five of the old gold mines are being unwatered by companies to determine the value and extent of the deposits. Among the old gold mines which have been prospected after being unwatered, are the Coggins Mine, Montgomery County; Howie Mine, Union County; Pioneer Mills Mine, Cabarrus County; Capps Hill Mine, Mecklenburg County. Plans are under way to investigate several of the other mines located in Mecklenburg, Davidson, Franklin, and Rutherford counties.

The United States Geological Survey, from a grant by the PWA, has had two field parties in the State during the early part of the year 1934. Dr. J. T. Pardee is in charge of this work and has had his headquarters at Gastonia, in Gaston County. James Volney Lewis is in charge of the party making investigations in Gaston, Mecklenburg and in the South Mountain Districts of Burke, McDowell and Rutherford counties. Carl B. Brown, Salisbury, N. C., has been in charge of the party making investigations in Union, Stanly, Montgomery, Randolph, Cabarrus, and Davidson counties. He established headquarters at Monroe, Union County, Albemarle, Stanly County, and Asheboro in Randolph County. The gold investigation work will be completed by October 1, 1934.

Copper. During the last two-year period, the Fontana Mine, Swain County, has been operating at about half capacity in spite of the low price of copper. The production of copper in the State during the last five-year period has averaged about seven million pounds annually. The production has varied from three and one-half millions to fourteen millions annually during this period.

Tin. The tin properties near Lincolnton, Lincoln County, have been investigated to a considerable extent during the past two years, and plans are under way, according to press reports, for the erection of a \$300,000.00 concentrating plant. It is reported that stone is being shipped to the property for the construction of the foundation for the mill. The company plans to produce tin concentrate, and mica and clay as by-products.

Nickel. Considerable interest has been shown recently by large companies in the tin deposits in Jackson County, especially in the vicinity of Addie and Webster. A great number of samples of the ore have been shipped to concentrating plants in the West to determine the best method of concentration. The preliminary tests have shown that the nickel ores can be concentrated and that a recovery of 90% or better has been established.

Lead-Zinc. Some interest has been shown during the last few months in the lead-zinc deposits in Montgomery, Haywood, and McDowell counties. Some prospecting has been carried on and concentration tests made. All three of the deposits so far prospected offer commercial possibilities.

NON-METALLIC MINERALS

Feldspar. Since the adoption of a feldspar code and the regulation of prices of the crude material, considerable activity has been shown in this industry during the past few months. In 1933 the State of North Carolina produced 58 per cent of the feldspar consumed in the United States. The price of feldspar has been set at \$5.50 to \$6.50 per ton for true material.

Mica. North Carolina continues to lead in the production of mica. In 1933 North Carolina produced 45 per cent of the sheet mica produced in America, and 79 per cent of the total sales of domestic scrap. North Carolina also leads in the production of mica schist. The price of mica in 1934 increased from five cents per pound on the smaller sizes to one dollar per pound on the larger sizes. The increased price is largely responsible for the increase in production.

Kaolin. The production of residual clay in North Carolina in 1933 is the lowest on record. However, the industry during the early part of 1934 has improved considerably due to the general improvement in the pottery industry. The Carolina Kaolin Corporation at Spruce Pine, N. C., has continued the prospecting of the large clay deposits in the southern end of Avery County and plans are under way for the erection of a clay-washing plant. This particular deposit is probably the largest ever discovered in the State of North Carolina. Something over 500 acres have been drilled and tunneled to determine the extent and quality of the deposit.

Talc. In spite of the depression, the production of talc in 1933 is the largest on record in this State for several years. This is due largely to the fact that pyrophyllite, a variety of talc, has been used to a considerable extent in the manufacture of battery boxes. One of the largest deposits so far known in North Carolina lying four miles west of Staley in Randolph County has been prospected to some extent and about 10,000 tons shipped for the purpose of the manufacture of silica-alumina refractories. This particular mineral has wonderful possibilities in the refractory, glass, and china-ware industries.

Kyanite. During the past biennium considerable interest and activity has been shown in the kyanite industry. Kyanite is used especially in the refractory trade. The capacity of the concentration plant, owned by the Celo Mines, Burnsville, N. C., has been increased. Reports coming to the office of the Division of Mineral Resources state that the plant has doubled capacity, and for several months during 1934 has operated day and night to fill orders.

Olivine. During the past biennium something over 300 carloads of olivine, a new refractory mineral, have been shipped from this State to northern markets. This mineral is especially valuable as a lining for steel furnaces. It has been reported that this mineral can be substituted for magnesite, a mineral which has been used for several years.

Vermiculite. Several carloads of vermiculite have been shipped from Clay, Macon, and Jackson counties. Considerable prospecting has been done in these counties to determine the extent and quality of the deposits. This mineral is especially valuable for insulating in both heat and sound insulating materials.

Limestone. The Soil Erosion Service, High Point, N. C., has called upon the State Geologist for complete information on the limestones existing in the upper Piedmont Section. During the early part of 1934 field work was conducted in

Stokes, Yadkin, Catawba, Lincoln, and Gaston counties. The deposits in these counties were found to be unsuitable for the use of the U. S. Soil Erosion Service. Further investigations were carried on and a deposit in the north end of McDowell County was found to be suitable for their purposes.

WELL LOCATIONS

During the past biennium, the State Geologist was called upon to make locations for wells for the State Highway Commission in the following counties: Jackson, Yancey, Alexander, Caldwell, Madison, Transylvania, Alleghany, Watauga, Scotland, Harnett, Orange, Cabarrus, Union, Johnston, and Martin. In addition to wells located in the above counties, information was also supplied the Highway Commission relative to water supplies at the Prison Camps in Davie, Durham, and Perquimans counties. In every instance, two or more trips were made to the above counties for the purpose of locating the wells, and later, for checking the flow of water in the wells. The travel expense involved was paid by the Highway Commission.

In addition to well locations for the Highway Commission, the State Geologist prepared a report on the possibilities of coal on a farm purchased by the Highway Commission in Moore County. The expense of this report was also borne by the Highway Commission.

During the past year, under the PWA allotment, many of the small towns in the State decided to drill or contemplated the drilling of deep wells for public water supplies. During the year the following towns were visited for the purpose of locating sites for deep wells: Carolina Beach, Elizabethtown, Manteo, Tarboro, Hemp, Madison, Granite Falls, Graham, Blowing Rock, Maiden, Swepsonville, Nashville, Stanley, Red Springs, St. Pauls, Elon College, Spencer, and Elizabeth City. The following towns have definitely decided upon constructing wells for water supplies: Carolina Beach, Elizabethtown, Hemp, Madison, Granite Falls, Graham, Maiden, Stanley, Red Springs, Spencer, and Elizabeth City.

During the year wells were located for the State Test Farm in Edgecombe County; the County Dairy, Guilford County; two schools in Davidson County; three schools in Rockingham County; one school in Chatham County. In addition to the above, a report was prepared giving information on the best possible source of water for fire protection at the County Home, Mecklenburg County. Reports were also prepared on the condition of water supplies and sanitary needs at five schools in Wayne County. To date, the State Test Farm, Edgecombe County, the County Home, Mecklenburg County, two schools in Davidson County, one school in Rockingham County, and one school in Chatham County have followed the advice given in the reports prepared by the Division of Mineral Resources.

Wells were also located for the following private individuals and industries: Steele's Mills, Rockingham County; Brown Manufacturing Company, Greensboro; Central Falls Mills, Randolph County; N. E. Edgerton, Raleigh; The Brewery, Statesville; Glencoe Mills, Burlington; and the American Enka Corporation, Asheville.

RECOMMENDATIONS

An appropriation should be granted to prepare a reliable geologic map of the State. No map covering this State has been published since 1896. Reports covering the gold deposits, nickel, copper, and lead-zinc should be prepared. An appropriation of at least \$10,000.00 would be necessary to complete such reports. Reports cover-

ing non-metallic minerals, such as kyanite, olivine, feldspar, mica, mica schist, and vermiculite, should also be prepared. Even though North Carolina is the leading producer of feldspar in America and furnishes more than 50 per cent of the mica produced in America, there are no reports to send out relative to these particular minerals. The total cost of reports covering these deposits would be approximately \$25,000.00.

Except for the report covering the Coastal Plain section of the State, no information is to be had relative to the ground water resources of the State. A great many small towns, industries, State institutions and schools rely entirely upon ground waters for supplies. Due to the lack of information on this particular subject, a great deal of money is expended annually by these in the drilling of dry holes. Between five and ten thousand dollars would be required to compile the information and publish a report on the ground water resources of the State.

Due to the Tennessee Valley Authority Program launched in Western North Carolina for the purpose of developing and distributing hydro-electric power at a very low rate, that section of the State should become eventually one of the leading industrial districts of the United States. The State supplies a great deal of the crude materials for the manufacture of ceramic products, roofing materials, wallpaper, battery boxes, rubber tires, and a great many of the cleansing materials. The State should, therefore, appropriate funds with which to have complete information on the raw materials for such industries.

DIVISION OF WATER RESOURCES AND ENGINEERING

INTRODUCTION

The past biennium saw several personnel changes in the Division. Professor Thorndike Saville, who had been Chief Engineer in charge of the Division since its formation, resigned in September, 1932, to accept the post of Professor of Hydraulic and Sanitary Engineering at New York University. He was succeeded by Chas. E. Ray, Jr., who had been connected with the Division since 1926. Mr. Ray resigned in July, 1933, to enter private business and was succeeded as Chief Engineer by H. D. Panton. Decreased appropriations also forced reduction of personnel; so that during the second year of the biennium the regular Division personnel consisted of a chief engineer, one assistant engineer, and a stenographer.

Reduced appropriations necessitated confining the activities of the Division to essentials, this being especially true of the second year when the appropriation from State funds amounted to only \$7,800.00 as compared with \$17,706.00 during the preceding year. The lack of funds has greatly handicapped the Division in its activities, and has forced a serious curtailment of its work. It is felt that much of the work carried on by this Division is essential to the proper and beneficial use of the water resources of the State. There is no natural resource of more fundamental importance to our citizens as is water. The fundamental data as to our water resources being collected and analyzed by this Division in coöperation with the United States Geological Survey is a long-time activity of increasing value which to achieve its full purpose must be continuous, and it is hoped that more adequate financial support for this essential activity will be provided by the 1935 session of the Legislature.

A brief outline of the activities of the Division under the several projects carried on during the biennium follows:

STREAM GAGING

Of the various activities of the Division its most important is that of establishing, maintaining, and operating stream gaging stations throughout the State to measure the day by day variations in the quantity of water flowing in our streams. This work is carried on in coöperation with the United States Geological Survey through its district office at Asheville. At present our stream gaging work is well organized; it has been considerably expanded, and the physical equipment of our gaging stations greatly improved during the past year due to special Federal funds allotted for this work by the Public Works Administration, the Civil Works Administration, and the Tennessee Valley Authority. These special Federal funds amount to a total of \$72,611.63 and are being spent under the supervision of the United States Geological Survey in adding to and improving the stream gaging facilities in North Carolina. The State will receive much benefit from these improved facilities without having furnished any of the funds used to provide them. This construction and improvement program was begun in October, 1933, and was nearly completed at the end of the biennium; such work as remained being scheduled for completion by August, 1934.

At the beginning of the biennium there were in operation 71 stream gaging stations, of which 48 were equipped with automatic recording instruments, and the remainder were staff or chain gage stations at which daily readings were made by an observer. Of the recorder stations 31 were of timber construction and many in a bad state of repair; the remaining 17 recorder stations were permanent structures of concrete construction.

During the first year of the biennium lack of funds forced the discontinuance of two observer-type gaging stations and no construction of new stations or improvement of existing stations was undertaken during this year. There were 69 gaging stations in service as of June 30, 1933.

During the second year of the biennium the construction and reconstruction program made possible by the special Federal funds provided for this purpose was carried through almost to completion, 37 reinforced concrete recorder-type gaging stations being built. Twelve of these are stations at new locations, 3 are at locations where a station had been operated at some time in the past and discontinued, 16 replaced observer-type stations, and 5 replaced timber-type recorder stations that were in poor condition. Also 17 recorder-type timber stations were relined with reinforced concrete to make them permanent structures; 18 cableways were built at gaging stations for making stream-flow measurements; and 4 concrete measuring flumes with silt traps were built at gaging stations on the Federal Soil Erosion Project near High Point. As a result of this construction program the end of the biennium finds us with 84 stream gaging stations in operation or under construction, this being the largest number of such stations ever in operation at one time in North Carolina. Of these 84 stations, 80 are automatic recorder type stations, 71 of permanent construction; and only 4 are observer type stations. It is hoped during the fiscal year 1934-35 to secure additional Federal funds to convert the 4 observer-type stations remaining to automatic recorder stations and to reline with concrete and recondition the 9 timber automatic recorder-type stations for which funds were not available under the construction program now being completed.

Of the 84 stream gaging stations in operation or under construction as of June 30, 1934, 72 are operated and maintained on a coöperative basis by the Department and the United States Geological Survey, and 12 stations are Federal stations, the entire cost of whose operation is paid from Federal funds.

Stream gaging work to be effective is a long time activity that must be carried on without interruption, as the records of a station must cover at least 10 years to begin to show the flow characteristics of a stream, and should cover not less than 30 years to tell the complete story. At present there are on North Carolina streams 5 station records of over 30 years; 10 records of 10-29 years; 57 records of 1-10 years, and 12 records of less than 1 year for stations recently established at new locations. A good start has just been made in the accurate measuring of the State's surface water resources. If the necessary basic data are to be secured to enable the future water supply problems of the cities, towns and industries to be efficiently solved—and these problems will become increasingly pressing with the passing of the years, and the continued urban and industrial growths of the State—then it is essential that adequate funds be provided by the State to carry on this useful and necessary work and to utilize to full advantage the excellent facilities we now have available. The appropriation made for the fiscal biennium 1933-35 is totally inadequate to supply the State's share of the cost of carrying on this essential work, and unless more adequate provision is made for carrying on our stream gaging during the next fiscal biennium, this work will have to be sharply curtailed, many of the gaging stations discontinued, and much of the money spent on this activity will have been

wasted as the stream-flow records secured from the discontinued stations will be of too short duration to be of much value.

Under Table 1 there follows a complete list of all stream gaging stations in operation or under construction in North Carolina as of June 30, 1934.

TABLE 1
STREAM GAGING STATIONS IN OPERATION IN NORTH CAROLINA AS OF JUNE 30, 1934

Station and Location	Type of Station
1. Broad River near Boiling Springs, N. C.	Recorder
2. Broad River near Chimney Rock, N. C.	do
3. (Second) Broad River at Cliffside, N. C.	do
4. Buffalo Creek near Greensboro, N. C.	do
5. (North) Buffalo Creek near Greensboro, N. C.	do
6. Cape Fear River at Fayetteville, N. C.	do
7. Cape Fear River at Lillington, N. C.	do
8. Contentnea Creek at Hookerton, N. C.	do
9. Contentnea Creek near Wilson, N. C.	do
10. Dan River near Francisco, N. C.	do
11. Dan River at Leaksville, N. C.	do
12. Deep River (E. Fork) near High Point, N. C.	do
13. Deep River (West Fork) near High Point, N. C.	do
14. Deep River at Moncure, N. C.	do
15. Deep River at Ramseur, N. C.	do
16. Deep River near Randleman, N. C.	do
17. Dial Creek at Bahama, N. C.	do
18. Eno River at Hillsboro, N. C.	Observer
19. Fisher River near Copeland, N. C.	do
20. Fishing Creek near Enfield, N. C.	Recorder
21. Flat River at Bahama, N. C.	do
22. Flat River at Dam near Bahama, N. C.	do
23. Haw River near Benaja, N. C.	do
24. Haw River at Haw River, N. C.	do
25. Haw River near Pittsboro, N. C.	do
26. Horsepen Creek near Battle Ground, N. C.	do
27. Linville River at Branch, N. C.	Observer
28. Little Sugar Creek near Charlotte, N. C.	Recorder
29. Lower Little River at Linden, N. C.	do
30. Lumber River at Boardman, N. C.	Observer
31. Mayo River near Price, N. C.	Recorder
32. Muddy Creek near Archdale, N. C.	do
33. Neuse River near Clayton, N. C.	do
34. Neuse River near Goldsboro, N. C.	do
35. Neuse River at Kinston, N. C.	do
36. Neuse River near Northside, N. C.	do
37. Pee Dee River near Rockingham, N. C.	do
38. Reedy Fork Creek near Gibsonville, N. C.	do
39. Roanoke River at Roanoke Rapids, N. C.	do
40. Rocky River near Norwood, N. C.	do
41. Tar River near Nashville, N. C.	do
42. Tar River at Tarboro, N. C.	do
43. Uharie River near Trinity, N. C.	do
44. Yadkin River at Wilkesboro, N. C.	do
45. Yadkin River at Yadkin College, N. C.	do
46. South Yadkin River at Cooleemee, N. C.	do
47. Little River at Princeton, N. C.	do
48. Bee Tree Creek near Swannanoa, N. C.	do
49. Cane River near Sioux, N. C.	do

TABLE 1

STREAM GAGING STATIONS IN OPERATION IN NORTH CAROLINA AS OF JUNE 30, 1934

—Continued

Station and Location	Type of Station
50. Cataloochee Creek near Cataloochee, N. C.	Recorder
51. Cullasaja Creek at Cullasaja, N. C.	do
52. Cullasaja Creek at Highlands, N. C.	do
53. Davidson River near Brevard, N. C.	do
54. French Broad River at Asheville, N. C.	do
55. French Broad River at Bent Creek, N. C.	do
56. French Broad River at Blantyre, N. C.	do
57. French Broad River at Calvert, N. C.	do
58. French Broad River at Hot Springs, N. C.	do
59. Hiwassee River near Hayesville, N. C.	do
60. Hiwassee River at Murphy, N. C.	do
61. Ivy River near Marshall, N. C.	do
62. Jonathan Creek at Cove Creek, N. C.	do
63. Laurel River near Stackhouse, N. C.	do
64. Little Tennessee River at Iotla, N. C.	do
65. Little Tennessee River at Judson, N. C.	do
66. Mills River near Mills River, N. C.	do
67. Mills River (South Fork) at The Pink Beds, N. C.	do
68. Nantahala River at Almond, N. C.	do
69. New River (North Fork) at Crumpler, N. C.	do
70. New River (South Fork) near Jefferson, N. C.	do
71. Nolichucky River at Poplar, N. C.	do
72. North Toe River near Spruce Pine, N. C.	do
73. Nottely River near Ranger, N. C.	do
74. Oconalufy River at Cherokee, N. C.	do
75. Pigeon River at Canton, N. C.	do
76. Pigeon River near Hepco, N. C.	do
77. Scotts Creek at Sylva, N. C.	do
78. South Toe River at New Dale, N. C.	do
79. Swannanoa River at Biltmore, N. C.	do
80. Swannanoa River (North Fork) near Black Mountain, N. C.	do
81. Tuckasegee River at Bryson, N. C.	do
82. Tuckasegee River at Dillsboro, N. C.	do
83. Tuckasegee River at Tuckasegee, N. C.	do
84. Valley River at Tomotla, N. C.	do

POWER STUDIES

Lack of funds restricted activities under this project to a minimum. An abstract of the War Department Report on the Tennessee Valley Project from the standpoint of its relation to North Carolina was prepared. The 1932 edition of the Southern Appalachian Power Map showing all electric generating stations and transmission lines in the Southeastern United States was issued and many copies of this map have been sold. The copyright for this map was originally held by Professor Thorndike Saville but has been transferred to the Department. Routine inquiries for power data have been filled.

During the biennium there have been no power developments of importance undertaken in North Carolina due to the depression. However, the total output of public utility power plants both hydro and steam during the calendar year 1933 was 1,956,893,000 K.W.H. as compared with 1,617,341,000 for the calendar year

1932, an increase of 21 per cent. The 1933 output was only 2 per cent below that for 1931, reflecting a very encouraging revival of industrial activity during 1933. At the end of 1933 there was 998,472 Kw. of installed capacity (both hydro and steam) in 83 power plants generating electricity for public use as compared with 993,475 Kw. in 86 power plants at the end of 1931.

At the present time the most important question in regard to the power situation in North Carolina is the effect the activities of the Tennessee Valley Authority will have on North Carolina and whether power from the Authority will be brought into Western North Carolina. So far it has been impossible to get any definite information in this connection.

HYDROLOGIC STUDIES

In addition to the stream gaging activities of the Division reviewed separately, the Division has coöperated with the United States Weather Bureau by operating the Weather Bureau Station at Chapel Hill; four rainfall stations in Durham and Person counties; and the evaporation stations on Lake Michie near Durham and on Narrows Lake near Badin. The data collected from these floating evaporation pans and from the land evaporation pan at Chapel Hill is the only information on evaporation being collected in the Southern States. This work was begun by the Division in 1928 and has been carried on continuously since.

Silt studies at Lake Michie were made in the summer of 1933 and the data secured worked-up; this work being financed by a coöperative grant from the City of Durham.

Numerous requests for data on evaporation, silt studies, rainfall, stream flow, etc., were received and complied with.

Drought studies were made for the period July to September, 1932, and monthly reports and forecasts were issued. Stream flows on many eastern streams in September, 1932, were the lowest on record.

COASTAL STUDIES

Coastal studies relating to beach erosion and inlets were greatly curtailed during the biennium. A field party was placed on the coast in the summer of 1932 and beach sections were re-run at Wrightsville Beach, Carolina Beach, Atlantic Beach (near Morehead City), and in the Wright Memorial Bridge-Rodanthe region. This party was in the field from August 2 to October 12. No funds were available for field work in the summer of 1933 or 1934. In addition to the above field work several inspections of coastal areas were made following storms or in conjunction with representatives of Federal agencies.

As one of its contributions to the coöperative study of the Wright Memorial Bridge-Rodanthe region, the United States Beach Erosion Board had aerial photographs made by the U. S. Army Air Service of this section of the coast. Aerial photographs were also taken at Wrightsville Beach.

Early in 1933 arrangements were made with the United States Coast Guard to have the 33 Coast Guard Stations from Cape Henry, Virginia, on the north to Fort Caswell at the mouth of the Cape Fear River on the south furnish individual reports on a standard form prepared by this Division following each locally damaging storm. These reports are sent in regularly and form a most valuable record of storm damage on the North Carolina coast. These reports were of special interest following the hurricane of August 22-23 and September 15-16, 1933. The latter was the worst and most destructive storm experienced by the Cape Hatteras region in many years.

In January 1933 a coöperative program was inaugurated for the collection and analysis as to salinity of water samples taken at several locations in Currituck, Roanoke and Croatan Sounds. This work is carried on in coöperation with the United States Army District Engineers' Office at Norfolk, Virginia, by whom the analyses are made.

STREAM SANITATION AND CONSERVATION

Lack of funds and personnel prevented any activity under this project other than the handling of routine inquiries and correspondence.

It is felt that the problem of stream pollution by industrial wastes is one of steadily growing importance and that this problem is not receiving nor has it ever received the attention it merits. Neither this Division nor the State Stream Sanitation Committee is at present in a position to handle adequately this problem; and it is felt funds should be secured from the next Legislature to provide the necessary personnel and equipment to make a thorough State-wide study of stream pollution by industrial wastes. Such a study is a necessary preliminary to the enactment of fair and effective legislation to control pollution of our streams and assure their preservation in such condition as to be of maximum benefit to the people of the State. The present laws in regard to stream pollution are ineffective.

CHEMICAL WATER ANALYSIS

A \$500.00 fellowship was established by the Department at the University of North Carolina for the session of 1932-33 to provide for the chemical analysis of water samples. Under this fellowship 91 composite 10-day water samples were analyzed and reports of the analyses prepared. These samples were collected during the period from November 1932 to June 1933 by volunteer collectors at the following points: Neuse River near Raleigh; Haw River near Bynum; Yadkin River at Yadkin College; South Yadkin River at Cooleemee; Yadkin River at Elkin; Tar River near Rocky Mount; and Cape Fear River near Fayetteville. Lack of funds prevented the continuance of the fellowship after the session of 1932-33 and no further work of this kind has been done since the summer of 1933.

Knowledge of the chemical qualities of both surface and underground waters is of importance in efforts to attract new industries to the State, in connection with the development of public water supplies, and for other purposes. Our present information on this subject is limited and entirely inadequate; and it is very desirable that this work should be resumed and continued until we have adequate data on the chemical qualities of both the surface and underground waters of all sections of the State.

DRAINAGE

No new drainage districts have been formed during the past two years, and at the present time drainage work is inactive except for mosquito control being done with Federal relief funds. Considerable data and information relating to drainage districts have been furnished to the Federal Land Bank of Columbia, South Carolina, and the Joint Stock Land Bank of Durham, N. C. Other than the handling of inquiries, the furnishing of information, and a short study in connection with a proposed drainage district in Halifax County which was not organized, no work on drainage has been done by the Division during the biennium.

UNDERGROUND WATERS

In coöperation with the United States Geological Survey the study of underground water table elevations has been carried on throughout the biennium, records being kept on a number of wells in various parts of the State. On July 1, 1932, twenty wells were under observation and by July 1, 1933, twenty-seven, six of which were equipped with recording gages. However, during the past year observations on 15 wells have been discontinued due to lack of funds and for various other reasons, so that as of June 30, 1934, there were only 12 wells under observation, of which 6 are equipped with recording gages.

Knowledge of the underground water resources of the State is at present very inadequate and it is most desirable that activities in this connection be expanded, especially in the eastern part of the State, and carried on in coöperation with the United States Geological Survey.

In September 1932, a coöperative investigation of the possibility of developing an underground water supply for Elizabeth City was undertaken in conjunction with the Ground Water Division of the United States Geological Survey. This investigation was completed in the summer of 1933 and a satisfactory and adequate ground water supply located.

Underground waters are the province of both this Division and that of Mineral Resources, and close coöperation on all work of this kind is maintained by the two Divisions.

MAPPING

No mapping work has been done by the Division during the biennium except that in connection with coastal studies. During the summer of 1933 a field party of the U. S. Coast and Geodetic Survey tied in the base line established by the Department in the Wright Memorial Bridge-Rodanthe region of the coast to a number of their stations.

It is believed every possible effort should be made to have the U. S. Geological Survey undertake the topographic mapping of additional quadrangles in North Carolina, as there will be no adequate topographic map of the State until this topographic mapping of the State by the Geological Survey is completed. At the present time only 19,040 square miles of the State's total area of 52,426 square miles has been mapped topographically, leaving 33,386 square miles for which there are no topographic maps. In addition, much of the area mapped in the western part of the State was done so many years ago that the maps are inadequate according to present standards, and these areas should be resurveyed. Considerable correspondence has been carried on with the U. S. Geological Survey in regard to topographic mapping in North Carolina. The survey estimates that to complete the topographic mapping of the State, including the remapping of areas for which the existing maps are obsolete, will cost \$1,800,000.00. There is little chance of this work being completed within the present generation without financial coöperation on the part of the State. The completion of the topographic mapping of the State would be of great value and provision should be made for financial coöperation by the State with the U. S. Geological Survey on this work.

STATE HYDRAULIC ENGINEERING

All work under this classification during the biennium was that done for the State Prison Department at Caledonia Prison Farm in Halifax County in connection with

the repair and improvement of the levee or dike along the Roanoke River to protect the farm from floods during periods of high water. All work at Caledonia Prison Farm under the supervision of this Division was completed in September 1933, and accepted as entirely satisfactory by the Prison Department. This work had included the removal of all trees and other growth from the levee including the grubbing up of all roots, the raising of the height of the levee for a distance of some 4.5 miles, the building of one mile of new levee, the repair of sections of the levee where seepage was taking place, the repair of the breach in the levee caused by the freshet of October 22, 1932, which washed out 250 feet of the levee, the installing of an additional outfall conduit through the levee, and the repair and improvement of the existing outfalls.

GENERAL RECOMMENDATIONS

It is desired during the next biennium to maintain the essential activities of the Division; to resume our coastal studies, and the investigation of the chemical properties of both our surface and underground water resources; and to undertake a State-wide study of stream pollution by industrial wastes.

It is recommended that our present stream gaging program shall be continued and the 84 stream gaging stations now in operation be maintained. In order to do this it is necessary that the State funds for this program during the biennium 1935-37 be increased over these available for the fiscal biennium 1933-35. It has only been possible to carry on this work on its present scale during the current biennium through special Federal assistance which will not be available after June 30, 1935.

Power studies will not be active and it is recommended that they be continued on their present basis. There is an active interest in rural electrification at the present time and the Division will cooperate with the Federal Emergency Relief Administration and the Governor's Committee in this work. The Chief Engineer of the Division is a member of this Committee. Contact will also be maintained with the activities of the Tennessee Valley Authority with regard to their effect on North Carolina.

It is recommended that the Division resume active field work in connection with the coastal studies in the summer of 1935. No field work has been done since the summer of 1932 and if the study of beach erosion and inlet changes in the coast areas that have been under observation is to be continued it is necessary that field operations be resumed by the summer of 1935.

Present knowledge of the chemical qualities of both surface and underground waters is inadequate and it is recommended that the Division resume the chemical analysis of water samples by reestablishing a fellowship in the Chemical Engineering Department of the Chapel Hill Division of the University of North Carolina and undertaking a continuing program of chemical water analysis closely correlated with our stream gaging and study of underground water resources. Such a program to accomplish its purpose will have to be continued over a period of years.

It is recommended that funds be provided to enable the Division to undertake a State-wide study of stream pollution by industrial wastes. Such a study will call for the addition to the Division personnel of a competent industrial chemist and sanitary engineer. It is believed such an investigation is much needed and will be of great and lasting benefit to the State in arriving at a solution of this problem, which has never received adequate attention and which is becoming of greater importance each year.

It is recommended that funds be provided to enable the Division to issue a revised

edition of Bulletin No. 34 "Discharge Records of North Carolina Streams." The original edition contained all available data from 1889 to 1923; and now there are 10 years of additional records available and due to errors in the original edition it is considered advisable to issue a revised edition covering the entire period from 1889 to 1933 rather than a supplement to cover the period 1924 to 1933.



